IDENTIFICATION OF COGNITIVE STYLE IN THE BILINGUAL SCHOOL

by

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This work is dedicated to the children of Pierson and Seville elementary schools, in the hope that their schooling experience might in some way become more positive.

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TABLE OF CONTENTS

LIST OF TABLES

TABLE

LIST OF FIGURES

FIGURE

Abstract of Dissertation Presented to the Graduate Council of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

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The question of whether learning style differences exist cross-culturally is the primary research hypothesis tested in this study. A multi-method approach was used in the rural tri-ethnic bilingual schools of Pierson and Seville, Florida. Employing a repeated measures design, the researcher tested 272 Anglo, Black, and Mexican students in grades 3 through 6 for field independence/field dependence with the Children's Embedded Figures Test (CEFT), the Perceptual Acuity Test (PAT), and the Child Rating Form Field Independent Observable Behaviors/Child Rating Form Field Sensitive Observable Behaviors (CRFFIOB/CRFFSOB) instrument set. This is the first time that these three instruments have been used together to identify cognitive style. In addition to ethnic group differences in cognitive style, the researcher investigated sex and grade level

differences as well as correlations among the three different instruments, all of which purport to measure field independence/field dependence.

Cognitive style refers to the ways in which an individual learns which include perceiving, thinking, problem solving, information processing, relating to others, etc. Field independence/field dependence are dimensions of the construct of cognitive style that refer to modes of functioning: Field independence is the tendency to rely on the self as a primary referent in information processing whereas field dependence is the tendency to rely on external referents. The researcher observed that the preferred cognitive style of the students as well as that of the teachers was field dependence. However, the teaching styles were largely field independent as was the structure of the school system. This qualitative conclusion supported the quantitative findings that no significant difference in cognitive style existed among the three different ethnic groups. No significant sex differences were found either. However, significant grade level differences were measured by the CEFT and CRFFIOB/CRFFSOB instruments, which were consistent with cognitive style theory that field independence/field dependence are developmental dimensions. Finally, there were no statistically significant correlations among the three different instruments used to measure cognitive style.

CHAPTER I
INTRODUCTION

The way or how an individual learns is a matter of style (Messick, 1976). Learning style or cognitive style is a multi-faceted construct that describes different modes of learning. The late Herman A. Witkin fathered the development of cognitive style by researching with his associates the field independent/field dependent dimension of the construct of cognitive style (Witkin et al., 1977a). Witkin began his work during World War II and continued developing his theory of psychological differentiation, as he called it, until his death in the late seventies. At first the subjects of investigation were from Anglo populations, but it was not long until cross-cultural studies by other researchers were begun to test field independence/field dependence dimensions in different contexts (Berry, 1966; Dershowitz, 1971). In addition, many new dimensions to the cognitive style construct were hypothesized and studied. By the sixties cognitive style research was extended another direction with the advent of bilingual/multicultural education.

The Problem of Identifying Cognitive Style

In 1974 Ramirez and Castaneda published Cultural Democracy, Bicognitive Development, and Education, a small but controversial book in an already controversial field,

bilingual education. Basically, these two researchers and their associates extended the work of Witkin and others for the specific case of the Mexican American. The major thesis of Ramirez and Castaneda is that Mexican Americans tend to have a different learning style than their Anglo counterparts, who are relatively more field independent. Originally the field independence/field dependence dimension was the construct of psychologists who tested and measured it in the clinical laboratory.

The work of Ramirez and Castaneda was typical of the efforts of educators, anthropologists and other social scientists who were taking the construct out of the laboratory and testing it in many new kinds of settings. Hence, the school became an appropriate investigative arena. As new politics and policies of schooling resulted from the implications of bilingual education alone, differences in cognitive style, cross-cultural or otherwise, resulted in new approaches to schooling. Further research required new instrumentation to explore cognitive style more easily outside the confines of a laboratory. With various instruments available to identify cognitive style, the problem then becomes one of accurately assessing field independence/field dependence cross-culturally.

The cross-cultural context most relevant to the purposes and intent of this study is the bilingual school. As a rural research site, the bilingual school affords access to Anglo as well as non-Anglo subjects for whom the

results of the investigation have the most implications. Furthermore, this multi-ethnic study is enhanced and complimented by a multi-method approach. As the literature review will show, the bulk of the research heretofore investigated differences in learning style utilizing only one measure of cognitive style, whereas more ambitious projects have recently used two or more measures of cognitive style (Buriel, 1978; Keogh and Ryan, 1971). Rivas (1979) in another study tried to correlate different dimensions of cognitive style. Ramirez and Price-Williams (1974), on the other hand, tried to measure field independence/field dependence in at least three different cultural groups.

This research has focused on a combination of three major American cultural groups using three different measures of field independence/field dependence to identify cognitive style. The cultural groups used include Anglo, Black, and Mexican migrant subjects from two sister elementary schools in rural Florida. The instruments utilized include two traditional psychological measures of field independence/field dependence and an observational checklist of field independent/field sensitive behaviors developed by Ramirez and Castaneda (1974). The three measures themselves afford a new perspective for viewing cognitive style: traditional psychological instruments versus an observational instrument. Indeed, the utilization of statistical or quantitative and qualitative analyses in

combination reflects the interdisciplinary attitude of bilingual graduate studies and the new field of anthropology and education.

Purpose of the Study

The purpose of this study reflects the attitude of bilingual education and applied anthropology in combination: to promote change in schooling in general and in bilingual schooling in particular. The implications of cognitive style theory in general suggest matching and mismatching learning styles with different teaching styles or modes of instruction (Messick, 1976), whereas bilingual schooling implies changing the school rather than the student to meet the needs of the culturally different child (Carter, 1970). The issue of congruency in learning style between school and pupil, however, is determined and settled by the school and not by the child or even his/her parents. Input to the school that helps to determine policy, especially in a bilingual setting, can be influenced by research. Therefore, the question of whether differences in learning style exist cross-culturally is an important one.

Specific to this research project is the question of whether learning style differences exist in the setting of the bilingual school that is predominantly Anglo. Of further importance is the question of whether learning style can be observed or must it be measured traditionally. Therefore, it is also important to know whether different instruments measure the same phenomena. If differences in learning styles can be demonstrated cross-culturally by the

ready assessment and identification through various instruments, then a case for the needs of the culturally different can be documented. However, change in schooling for the special interest of bilingual education is not the only purpose of this research. Awareness that unique individuals learn in different ways can also be the basis for change to better the schooling experience for all children.

Background of the Construct

Learning is complex process. By focusing on cognitive style, i.e., the way in which an individual learns, this research approaches the multi-faceted problem of learning in a global fashion. Whereas anthropology has always insisted on the universality of humankind and the equality of intellectual ability in the species, the cultural differences in cognitive functioning have long been a paradox in that field.

Paredes and Hepburn (1976) confront this issue and attempt to resolve it with the developments in split brain and cognitive style research. The basic resolution of the culture-and-cognition paradox as viewed by these two authors is the situation-specific application of cognitive processes to explain cultural differences. That is to say, various cultures neither have nor lack different cognitive processes, rather, the utilization of one process over another is determined by the particular circumstance for which it is required. And so it is with the individual who

prefers one learning style over another. His/her preference is determined by his/her specific situation or circumstance and is the result of socialization and child rearing practices within the culture. The primary family and later the peer group to which the individual belongs produce these differences in cultural style.

Cohen (1969), another anthropologist, in dealing with the American schooling culture further categorizes the primary groups to which an individual belongs. Formal groups are those in which critical functions are assigned on a status-role basis, and the converse, which she calls shared-function groups, are those in which tasks are performed by all the group's members. Class differences distinguish these two socializing groups, with the middle class and the lower class being the shared-function group. Cohen goes on to relate these two basic differences in group organization to the cognitive styles of the school and the family/peer group. Rather than field independent/field dependent, she uses the terms analytical/relational conceptual styles. For all practical purposes the two sets of dimensions and labels are equivalent. Her major thesis, however, is that American schools encourage and teach the analytic or field independent cognitive style over the relational or field dependent mode of learning. Whether or not school children learn to be field independent or analytic learners is another whole issue concerning achievement and failure.

In addition to socialization and child rearing practices, genetics is thought to be a determinant factor of cognitive style. The influence of genetics on cognitive style is much more difficult to establish and requires lengthy longitudinal investigations. Messick (1976) reports some such studies underway. Nevertheless, the majority of studies dealing with social and cultural factors and cognitive style are not longitudinal. However, a cross-cultural longitudinal study dealing with Mexican and American children does exist. It is a study completed during the seventies for the Hogg Foundation for Mental Health (Holtzman et al., 1975). The study deals with over 400 school children from Mexico City and Austin, Texas, including grades 1-12. The project is comprehensive in nature and deals with family as well as school socialization experiences. A huge battery of instruments was utilized in the course of the project, including specific tests of cognitive style, such as Witkin's Embedded Figures Test. It was concluded that this longitudinal study did show a statistically significant difference between the American and Mexican regarding field independence/field dependence, with the Americans being more field independent than the Mexicans. However, it was stressed that by grade five this difference was no longer statistically significant (p. 323). Furthermore, parent interview items regarding socialization practices were not sensitive enough to permit correlational studies with field independency, although such interviews were a major feature of the study.

Definitions and Characteristics of the Construct

Before continuing with the social and cultural framework within which cognitive style exists, let us now focus on the construct itself and how it is defined by its author and others. Witkin (1979) ultimately defined cognitive styles as modes of functioning: He defined the field independent mode of functioning as the tendency to rely on the self as a primary referent in information processing and the field dependent mode of functioning as the tendency to rely on external referents in information processing (p.359). Originally Witkin developed a theory of psycho- logical differentiation in which field independence/ field dependence were separate cognitive style components (Witkin et al., 1974). Field independence/field dependence have to do with perceptual functioning in which parts of a whole complex field are disembedded. Whereas field independence refers to perceiving the part from the whole or disembedding a figure from a complex design, field dependence refers to the tendency to perceive that complex whole in a global fashion without focusing on the embedded part of a given field. Hence, other terms emerge from this basic explanation of perceptual phenomena. In an earlier paper (1967) Witkin discusses the global-analytical dimension of cognitive style with regard to articulation of the self and body concept from a particular field. Here articulation and differentiation are synonymous, since individuals commence to regard themselves as separate identities, viewing themselves and their bodies as separate indeed from the

backdrop or field of physical, social, and psychological environment. This concept of psychological differentiation reflects both an outer and inner self, or physical and psychological self, as discrete from the existing environment, so that greater articulation, differentiation and self identity are the result of growth and development in both thinking and perception. This progression from the global to the articulated is developmental in both self concept and body, and it has other consequences: field independence/field dependence are developmental dimensions as well. The older individuals become, the more field independent they become until a state of developmental stability is reached (Witkin et al., 1977a, p. 15). The stability of field independence/field dependence over time is regarded as one of cognitive style's chief characteristics.

Another characteristic of cognitive style already alluded to in the above discussion is that of its pervasiveness. The term cognitive style suggests cognition, although it is defined in terms of perception. Messick (1976) best explains the pervasive character of cognitive style by stating that, although the construct is related to intelligence and intellectual development, its deep roots lie in personality development. In this way perception links intelligence to personality characteristics. Because of the special relationship of cognitive style to personality, tests of cognitive style can measure non-cognitive attributes and nonverbal attributes as well

(Witkin et al., 1977a, p. 15). Furthermore, intelligence measures can also be ascertained. For instance, the Weschsler Subtests of Block Design, Object Assembly and Picture Completion are also used as scales to measure field independence/field dependence. Particular personality characteristics that relate to field independence/field dependence are still identified by research. However, certain characteristics such as social attentiveness to what others say and do as well as paying attention to social cues and, especially, to faces are already well documented as being related to field dependence (Witkin et al., 1977a; Messick, 1976; Ramirez and Castaneda, 1974).

A third characteristic of cognitive style in general is the bipolar nature of this continuous dimension (Witkin et al., 1977a, p. 166). This is to say that, unlike such individual abilities as intelligence or IQ, which are value laden dimensions, cognitive styles are bipolar dimensions in which either pole is of equal worth. It must be said, however, that in earlier works Witkin did not express the equal value of field independence/field dependence in his theory of psychological differentiation. Ramirez and Castaneda (1974, pp. 73-76) take issue with Witkin's theory as explained in his volume Psychological Differentiation (Witkin et al., 1962), where the developmental nature of the dimension is emphasized. It was theorized that small children were by nature field dependent, developing field independence with age. Hence, field independence was viewed as a learning style associated with adulthood and maturity,

whereas field dependence connoted childishness and immaturity. Value labeling of the two dimensions was carried to yet another extreme of misrepresentation with the description of Western and technologically developed societies as field independent (Ramirez and Castaneda, 1974, p. 115). Cohen's 1969 report of the American school's favoring and rewarding the analytical or field independent style of learning reinforced the stereotyping of relational or field dependent learning styles as less desirable. Therefore, Witkin insisted in 1977 (Witkin et al., 1977a) that, regarding the educational implications of cognitive style, these bipolar dimensions are not value laden but of equal worth. Witkin's desire to not be misrepresented on this point is clarified in his 1979 article published shortly after his death:

> . . . Specifically, the field-dependence-independence cognitive-style dimension is value-neutral. This characteristic, in turn, is a function of its bipolarity -- that is, it does not have a clear 'high' or 'low' end. Thus, with regard to level, field-independent people tend to be high in cognitive restructuring skills and low in interpersonal competencies. Conversely, field-dependent people are likely to be high in interpersonal competencies and low in restructuring skills. It follows from this that it is not inherently better or worse for a person to be located at one end of the field-dependence-independence cognitive style dimension than the other. (p. 363)

An example given by Witkin in his 1977 (Witkin et al., 1977a) article should help clarify this issue. He used the difference between two types of nurses to illustrate the specialization of learning style in vocational tasks. Surgical nurses have been shown to be more field independent

since their job deals primarily with anatomy, requiring more of the impersonal personality traits associated with disembedding a part from a whole. Psychiatric nurses, on the other hand, have been shown to be more field dependent, since their job deals primarily with interpersonal interactions, requiring personality traits associated with attentiveness to social cues and situations. Both types of nurses are necessary, with vocational suitability being the real issue, not the relative worth of one type of nursing or learning style over the other.

Nevertheless, the issue of value in cognitive style is not easily resolved. The continuous nature of this bipolar variable presents other related problems in attempting to measure it. The very instruments designed to quantify cognitive style measure the extent to which an individual is field independent. There exists to date no instrument that measures the extent to which an individual is field dependent. The cognitive style construct can be explained as a continuum with field independence/field dependence representing the two polar extremes. Most people fall somewhere in the middle, exhibiting tendencies in both directions depending on the particular situation in which they must draw upon a learning style, preferred or not, in order to cope. Ramirez and Castaneda (1974) call this learning or coping strategy bicognition. In attempting to deal with the value dilemma of cognitive style, these two researchers develop an alternative explanation to Witkin's continuous bipolar construct. Instead of bipolar, Ramirez

and Castaneda theorize field independence/field dependence to be two separate cognitive styles:

> . . . The fact that research shows that children tend to do better on the Portable Rod and Frame and Embedded Figures tests as they grow older does not exclude the possibility that they may also be continuing to develop in ways appropriate to the field-dependent style, and this may be a more relevant possibility for children growing up in bicultural environments. While the Portable Rod and Frame and Embedded Figures tests may be adequate measures of field independence our observations show that they do not accurately measure field dependence. Thus, just because a child's performance on the Portable Rod and Frame Test indicates that he is becoming more field independent as he grows older does not necessarily mean that he is becoming less field dependent. (p. 74)

Ramirez and Castaneda's extension of Witkin's original theory draws support from Cohen's 1969 report as well as from the split brain research of Ornstein (1973) and others.

The whole idea of two separate cognitive styles instead of one lends itself well to theories of hemispheric domination resulting from split brain research. The preference for one learning style over the other is viewed by Ramirez and Castaneda as learning to use one side of the brain in preference to the other. Hemispheric domination and dominant learning style go hand in hand, since it had been discovered by researchers such as Ornstein that the field independent dimension of cognitive style matches up with the left brain, which functions analytically, while the field dependent dimension corresponds to the right brain, which functions relationally. (Be aware that while Witkin frequently uses the terminology global/analytic, relational/analytic are Cohen's terms for field dependence and field independence, and field independent/field sensi-

tive are the labels of Ramirez and Castaneda.) Whereas in reality the two sides of the brain work in harmony with one another, the point of split brain research is to demonstrate the dominant or preferred functioning of one side over the other in a given individual, situation or culture.

However, the purpose of Ramirez and Castaneda's work is to promote bilingualism, biculturalism and bicognition. These products are believed to enhance self-esteem and intellectual development, since they give the individual options and choices in coping with and dealing with life and learning problems. Bilingualism, biculturalism and bicognition are resources that an individual can draw upon if developed as intellectual alternatives. Nevertheless, the extension of Witkin's theory of psychological differentiation by Ramirez and Castaneda is limited. While bilingualism and biculturalism are worthy goals, the notion of bicognition theorized by these two researchers is yet to be empirically established. While Witkin maintains the developmental nature of field independence, Ramirez and Castaneda separate the two dimensions, attributing them equal status. They assume the two sets of behaviors can be learned, the flexible use of both behaviors being termed bicognitive, a misnomer that implies two brains or minds that function separately.

The polemic of field independence/field dependence as to whether it is best characterized as a bipolar continuous variable or as two separate cognitive styles is indeed the result of Ramirez and Castaneda's extension of Witkin's

original theory. The polemic was in part derived from the issue of valuing one cognitive style over the other. Carter (1970) transforms this polemic into a real dilemma when he critiques Ramirez and Castaneda's theory by declaring that it stereotypes Mexican Americans. Teachers, educators, and school officials begin to see various cultural groups in monolithic fashion without regard to individual and intra-group variability. Field dependence or field sensitivity, as Ramirez and Castaneda prefer to call it, becomes characteristic of all Mexican Americans, or of any other non-Anglo ethnic group member for that matter. This stereotyping is probably the result of a poor concept of cognitive style and of misunderstanding the implications of the construct. The desire to explain differences between Anglos and non-Anglos in the classroom permits learning style to be an easy focus of overgeneralization.

The continuum of cognitive style is seen in the phenomenon of acculturation. Ramirez and Castaneda approach acculturation and cognitive style by dwelling on three different community types: traditional, dualistic and atraditional (1974, pp. 100-101). These researchers characterize the traditional community as field sensitive, the dualistic as mixed but tending toward field independence, and the atraditional as largely field independent. The flux of acculturating communities with regard to cognitive style depends on the degree of culture conflict and the ability to cope with a new and unfamiliar dominant culture. In the school, culture conflict depends on the attitude of

the authorities toward the non-Anglo ethnic group. Here traditional versus maintenance programs in bilingual education becomes an issue. If the school desires to change the child, then transitional bilingual education is appropriate. If the child is field dependent, then coping with the field independent mode of learning may produce culture conflict in him/her. If the school desires to change and maintain the culture of the child in addition to his/her language, then culture conflict in cognitive style can be reduced either by accepting the cognitive style of the child as he/she is or by approaching him/her with the opposite as an alternative. This is where Ramirez and Castaneda's theory of bicognition affords the school a dramatic opportunity to change in behalf of the children it serves (1974).

Culture conflict is a dominant theme in the work of Cohen (1969); Ramirez and Castaneda (1974); Castaneda et al. (1979); Carter (1970); Carter and Segura (1979). In her study Cohen (1969) isolates a particular conflict group of special interest as one in which the conceptual style does not overlap with the cognitive style. In this case it is the anxious group of learners who are not only highly analytical but also highly field dependent (p. 836). This is in addition to the general situation of culture conflict produced by the school's rewarding and favoring the analytical type of conceptual style, which emphasizes impersonal reality structure, isolating the individual into impersonal learning stimuli, demanding increasingly longer periods of sitting time, and observing and valuing

compartmentalized time schedules (p. 830). Those individuals who do not accept or fit into analytical and field independent modes of schooling style soon become labeled as socially and cognitively disruptive and deviant and are dealt with accordingly. The tragedy of monostyled schooling modes is that not all individuals can fit into a unistructured mode. Furthermore, individuals do not even have a choice, since public schooling is compulsory.

The work of Ramirez and Castaneda (1974) can be viewed as a plea for cultural democracy. They refute the notions of the melting pot and of cultural assimilation as damaging. Instead, cultural democracy affords an opportunity to accept and nurture one's own mother tongue and culture in the school while learning the dominant Anglo language and culture. By extension, an individual's first cognitive style can be maintained with the enhanced asset of bicognitive development, rather than replaced in a self-abnegating fashion with the dominant learning style of the school. According to Ramirez and Castaneda, another product of bilingual-multicultural education in a culturally democratic environment would be bicognition, a novel and rich means of overcoming culture conflict.

Castaneda et al. (1974) approach the problem of culture conflict historically as a need for change. Traditionally, in the Southwest the Mexican American has been at the mercy of the Anglo-dominated public school. These editors document the case of the Mexican American. Schooling control must be placed in the hands of those affected by it.

Hence, the political nature of the bilingual movement is emphasized.

Carter, in both his 1970 and 1979 (Carter, 1970; Carter and Segura, 1979) works, also promotes the need for change in the school. With his philosophy of changing the school not the child, he sees bilingual education as just one means of dealing with culture conflict. The problem of culture conflict within the school is serious no matter whether cognitive styles are developmental or separate. Either way, these bipolar dimensions should be value-neutral. However, in schooling practices the reality is that field independence is still the preferred learning style with bicognition only an idealized notion.

Let us close this section with a last characteristic of cognitive style. This last characteristic of cognitive style is the same one by which this problem was introduced, namely, that cognitive style is defined in terms of how an individual learns. Witkin (Witkin et al., 1977a, p. 15) includes perceiving, thinking, problem solving, learning, relating to others, etc., within the construct of cognitive style. The emphasis is on the form of learning, i.e., the process itself rather than the content. That learning is a process should be of special interest to educators. If one understands how an individual learns, then it stands to reason that one could better teach others a specific content or better understand oneself for that matter. Nevertheless, an educator with the concept of learning style in mind could better determine strategies for particular individuals or

better plan strategies dictated by a particular content. This is the choice that a knowledge of learning style affords.

Hypotheses to be Tested

Pertinent variables for testing of specific hypotheses were selected according to their relevance to cognitive style research findings. Witkin et al. (1971) in the Manual for the Children's Embedded Figures Test reiterate the general cognitive style findings for field independence/field dependence that males tend to be more field independent than females and that younger children tend to be more field dependent than older ones, with growth toward field independence stabilizing in young adulthood. Hence the variables of age and gender are considered important to cognitive style research in general. Because this study is a cross-cultural investigation, ethnic group is also an independent variable of primary importance. Therefore, the variables of grade for age, sex for gender, and cultural group for ethnicity have been selected to afford maximum concordance with other cognitive style investigations. The dependent variable or the outcome of most interest in this study is, of course, cognitive style. In addition, since the nature of this investigation is multi-method, the approach begs the testing of yet another hypothesis concerning correlation among the various instruments utilized to measure learning style. The

following are the four principal hypotheses of major interest to be tested:

1. There are no differences in cognitive style among Anglo, Black, and Mexican ethnic groups.
2. There are no differences in cognitive style between males and females.
3. There are no differences in cognitive style among grade levels for third through sixth grades.
4. There are no correlations among the measures of cognitive style.

The multi-method approach of this study has in part determined the specific grade levels to be measured for learning style. The non-availability of three measures of cognitive style appropriate for very young elementary school children made third grade a cut off point for measuring learning style. Furthermore, not all tests of cognitive style measure the same dimension. For instance, the Matching Familiar Figures Test has been designed to measure the impulsivity/reflectivity dimension of the construct of cognitive style. This study investigates the problem of identifying the field independent/field dependent dimension of cognitive style. Various tests and measures exist to identify learning style, but few multi-method studies have been done to determine if, indeed, the instruments measure the same construct in question. Therefore, correlations between the instruments themselves, as well as their reliability in measuring what they are purported to measure, are of interest in this investigation.

Instruments for Measuring Field Independence/Field Dependence

Historical backgrounds for the tests and instruments developed for quantifying field independence/field dependence can be found in Witkin et al. (1977a); Messick (1976); and Ramirez and Castaneda (1974). In the beginning, Witkin was an Air Force psychologist working on the problem of screening candidates for pilot training in World War II. Obviously, time was of the essence. Witkin's novel solution to the problem was based on the perception of the upright, a skill required for piloting aircraft safely. The apparati invented by Witkin are very reminiscent of flight simulators. As Witkin developed these instruments to screen for potential pilots, he also constructed his theory of field independence/field dependence.

One of his instruments, the Rod-and-Frame Test, consisted of a luminous rod surrounded by a frame in a darkened laboratory room. After the examiner tilts the rod and frame so many degrees to the left or right, the subject attempts to align the rod to its vertical position, regardless of the position of the frame. In so doing the subject must rely on his/her own body feedback from gravity, etc., since the purpose of darkening the room is to minimize cues that would interfere with the subject's own perceptions. From this procedure Witkin was able to determine two basic types of perception: those subjects with well-developed internal sensory feedback who could perform the task easily, and those who could not perform the

task well with the use of external stimuli to provide cues as to the true upright position of the rod. Those subjects termed field independent proved to be the military's best investments for pilot training in a war-time situation. The other subjects were termed field dependent and were utilized in other capacities. Thus, the subjects deemed field independent were, indeed, valued differently than those deemed field dependent, if one considers pilot training more prestigious than other types of Air Force training.

Another type of device developed by Witkin and his research colleagues to determine field independence/field dependence is the Body Adjustment Test. This involves a small room with a chair in it, both of which are made to tilt clockwise or counterclockwise by the examiner. The subject seated in the chair is asked to return the chair to its normal upright position regardless of the orientation of the room. Instead of manipulating a rod the subject must now adjust his/her whole body within the context of a manipulated room. The task still requires internal cues to provide the necessary feedback if the subject is to perform well, i.e., to return the chair to its natural sitting position. Amazingly, field dependent individuals may declare that they are sitting normally and comfortable while actually at an unnatural angle in relation to gravity.

With the passing of the war Witkin was one of the first to see the application of his construct to areas other than the military. In particular, education proved to be a promising arena for further research and development.

However, the laboratory nature of these early clinical tests proved to be too bulky and cumbersome for use in measuring masses of school children for field independence/field dependence. To this end Oltman (1968) devised a Portable Rod-and-Frame Test that could be readily used outside the confines of the clinical laboratory. The Portable Rod-and Frame Test has since been used extensively in cognitive style research. A variation of this device is the Man-in-the-Frame Test in which a human silhouette or a clown replaces the traditional rod. Younger children are believed to relate better to the human form or clown rather than the sterile rod. It stands to reason that children who are more field dependent relative to adults would find a human form intrinsically more interesting and appealing.

Criticism of the rod and frame instruments is also part of the history of the construct. Rosenburg, Mintz, and Clark (1977) briefly review the problems associated with rod and frame instruments as well as construct validity for the entire field independence/field dependence phenomenon. They report Reinkerg's (1977) investigation of situational variables affecting performance of rod and frame tests. Goodenough (1981) continues with a current critique of the rod-and-frame illusion which had been under attack by Fine (1980) in the same journal for being susceptible to the influence of perceptual variables on the part of both the examiner and the subject. Goodenough does not want to fall prey to the logical error of throwing the baby out with the bath water and defends the relative validity of rod-and-

frame research, notwithstanding the various problems associated with these particular instruments. He concludes that a solution to the problem may be found in frame size as well as in a better understanding of what mechanisms produce this particular illusion.

Witkin must have been well aware of the problems and limitations of the rod-and-frame instruments from the very beginning, for he and other colleagues immediately set about to devise other means of measuring the field independence/field dependence phenomena. Along with Oltman, Raskin, and Karp, Witkin has authored the Embedded Figures Test, Children's Embedded Figures Test and Group Embedded Figures Test (Witkin et al., 1971). The original Embedded Figures Test was the result of the discovery that figure/ground perception was related to the problem of how an individual locates the upright in space. According to Witkin, disembedding a particular figure from a complex background or field utilizes the same type of perceptual skills involved in locating the true upright in space (Witkin et al., 1971). Analytical skills of seeing the part distinguished from the whole are at the crux of field independence/field dependence. Furthermore, Witkin and his associates also found that figure/ground disembedment was not merely a perceptual skill of vision, but that auditory and tactile perception were subject to the same phenomena of field independence/field dependence. Therefore, the method of using various tests of embedded figures was generally accepted as an alternative means of measuring cognitive

style. Certainly these embedded figures are less cumbersome instruments than any rod-and-frame apparatus. According to the combined Manual for the three tests, the authors are satisfied that they are basically equivalent and measure the same phenomena as the original Rod-and-Frame Test (Witkin et al., 1971). The basic difference is that the Embedded Figures Test, which was designed for older individuals, is the forerunner of all embedded figures tests. The Group Embedded Figures Test is also designed for older subjects, having been normed on college students. As its name implies, it was designed to be able to take a large amount of data conveniently at one time from a single group. The Children's Embedded Figures Test was designed for individual administration, as are most other tests using embedded figures or rod-and-frames. There does exist one other related instrument, the Pre-School Embedded Figures Test, authored by another researcher (Coates, 1972) and designed for those children too young for the Children's Embedded Figures Test.

Several other measures of field independence/field dependence have also been developed by various researchers and are seen from time to time in the literature. One such measure of field independence/field dependence is the Draw-a-Person Test. According to Ramirez and Castaneda (1974, p. 165) it is relatively simple to administer but difficult to score consistently without the examiner's being adequately trained. With this measure of cognitive style the child is given a piece of paper and asked to draw a

person, just as the name of the test implies. Upon completion of the task the child is asked to draw yet another picture, that of the opposite sex from the first drawing made. A rating scale is then used to score the drawings for detail and sophistication. This instrument, which also came out of some of the earlier work of Witkin and associates, is sometimes referred to as the Human Figure Drawing Test (Holtzman et al., 1975, p. 26).

From time to time the Wechsler Intelligence Scale for Children Block-Design Subtest is seen in the literature as a measure of field independence/field dependence (Holtzman et al., 1975; Buriel, 1978). This subtest, which can be used separately from the complete intelligence test, measures cognitive style by indexing the task of copying increasingly complex designs with small colorful blocks in an allotted time.

Another instrument called the Perceptual Acuity Test, authored by Harrison Gough, is also believed to measure field independence/field dependence (Gough and Olton, 1972). It uses the principle of optical illusions and is presented by means of projected transparencies. Designed to measure cognitive style in group fashion, this test presents a geometric figure as a test item. Five alternate choices are given in which the subject is to find the one that corresponds to the representative figure in either size or shape.

An instrument that is the product of research by Ramirez and Castaneda in cognitive style is the Child Rating

Form for Field Independent Observable Behaviors and the Child Rating Form for Field Sensitive Observable Behaviors. This dual instrument was designed for teacher training purposes in bilingual and multicultural education. These observational checklists, the products of research in field independence/field dependence, afford a new approach to determining and identifying cognitive style.

With the exception of the Child Rating Forms, the problem inherent in all of the above instruments that purport to measure cognitive style is that they all measure the degree or extent only to which an individual is field independent. All are scored or scaled as a continuous variable that assigns the higher score to field independency. That is to say, a lower score of this continuous bipolar dimension on any of these measures indicates field dependence. This bias builds in a value of inequality among the subjects measured. To emphasize the relative nature of the field independent/field dependent dimension of cognitive style does not diminish the feelings of inferiority of subjects who realize that they have not performed well on any of the above tasks. The problem once again stated in converse terms is that there exists no cognitive style instrument that measures the degree or extent to which a person is field dependent. There is no good answer to children who ask if they did well on any of the above tests. Conditioned by the schooling experience to compete, their feelings give them the answer when they

realize that they were unable to satisfactorily complete any of the above exercises or tasks.

The beauty of the Child Rating Forms of Field Independent/Field Sensitive Observable Behaviors is that they may be the first instruments of their kind to approach field dependence in a value neutral and non-denigrating fashion. To be sure, they have been designed to quantify frequencies of field independent and field sensitive observable behaviors, but they can also be used in a global fashion to indicate preferred or dominant learning style. Furthermore, since they are observational instruments, they require no participation from the subjects for whom they were intended to identify. These checklist instruments can be used by teachers, educators, psychologists, anthropologists, etc., without the resulting questions from subjects inquiring as to how they faired on that test. The traditional instruments discussed above for measuring cognitive style are conspicuous in that they were designed for research and are seldom used for self knowledge on the part of the subject tested. Learning style information should be shared by all involved, but it has not reached that level of conscienceness-raising. Indeed, cognitive style has not yet been deemed of consequence by schools on any large scale.

By asking the question in this research of whether cognitive styles are different cross-culturally, the act of identifying and measuring them begs their existence. If different learning styles do indeed exist, the ramifications

of their implications are yet to be implemented in school. Hence, the value of Ramirez and Castaneda's observable behaviors checklists is doubled in that the rating forms serve as both teacher training and research instruments.

Significance of the Study

The purpose of this research is to identify cognitive style in the rural bilingual school using a multi-method approach. Of the various instruments available, three have been selected for use in data collection. The significance of this study, therefore, rests with its undertaking to measure three different ethnic groups--Anglo, Black, and Mexican migrant--by three different instruments which purport to measure cognitive style. Not only will there be findings with regard to cross-cultural differences in the field independent/field dependent dimensions of the construct of cognitive style, but there will also be information concerning the reliability and the correlation of the instruments chosen to quantify the construct. Few studies undertake the comparison of more than a couple of different ethnic groups at one time, and even fewer employ more than one instrument at a time. Furthermore, this researcher is attempting to bridge the gap between the qualitative and quantitative research methods by utilizing two traditional psychological instruments that measure cognitive style together with an observational instrument set that identifies the two poles of the construct by checklists which can either be quantified or treated as categorical data.

The particular instruments selected are the Children's Embedded Figures Test, the Perceptual Acuity Test, and the Child Rating Forms for Field Independent/Field Sensitive Observable Behaviors. This combination of instruments has never been used in any research heretofore. The repeated measures research design (Glass and Stanley, 1970) of this project will analyze the data by means of analysis of variance, chi-square tests, and correlation statistical procedures. Of even more import to bilingual/multicultural schooling will be the information gathered concerning the learning styles of the three different ethnic groups measured. Placing the entire study in the perspective of a multi-methodology will not only enhance the findings but anchor the research to a meaningful context.

Limitations of the Study

The limitations of a cross-cultural multi-method rural research project have to do with the generalizability of the data and findings to similar settings. Necessarily, the instruments selected deal with quantitative assessments of cognitive style. The three ethnic groups (Anglos, Blacks, Mexicans) selected for measurement are of broad interest because they constitute the ethnic majority and the two major ethnic minorities. The Mexican migrant students are of particular interest because their schooling needs are being dealt with through bilingual education. The multi-method approach of this study is meant to provide a qualitative explanation of the data.

The specific limitations of this study which pertain to the rural research site chosen have to do with the particular instruments utilized and the nature of the students and school. In the beginning the original school, Seville, was selected because it served a small Mexican migrant population in addition to the established Anglo and Black communities. The school was previously unstudied except for Smith (1980), whose work appeared during the course of this researcher's data collection. Originally the researcher proposed to study just the one small rural elementary bilingual school, before she arrived on the site and found that the Mexican migrant and Black populations were too small to sample from. It then came to the attention of the researcher that a sister school, Pierson, existed just five miles down the road. The second school qualified as a sister school not only because of its proximity to the original site, but because the two populations were homogeneous, in that extended families were served by both schools, and because the schools themselves shared personnel and staff. When the study became limited to the two schools, the testing population was also narrowed to the third through sixth grades. It became necessary to select three instruments that would be appropriate to those grade levels, since the existing instruments ranged in age from pre-school to adult. It was also necessary to qualify instruments on the basis of their cross-cultural administration ease for bilingual students with limited English speaking ability. Once the testing procedure began

the researcher set about testing as much as possible of the entire population in the two schools within the four grade levels limited by the age range of the instruments selected.

Organization of the Study

In concluding this presentation of the cognitive style construct and the introduction to the problem of identifying cognitive style, a brief overview of the remainder of the dissertation will be given to place the rest of the study in perspective. This introductory chapter will be followed by a review of the literature in which both pertinent and related research will be examined. The focus will be on cross-cultural cognitive style research that compares Mexican Americans and Anglos in the dimensions of field independence/field dependence. The third chapter will outline in detail the methodology utilized as well as examine the particular instruments employed. Information concerning the schools and sampled population will also be included in Chapter 4, the multi-methodology used for identifying cognitive style in the rural bilingual schools studied. The results of the actual testing and observations will be presented in the fifth chapter of findings. The sixth and last chapter, which summarizes this research project, will also include conclusions and recommendations with respect to the cognitive style construct. This brief outline of the rest of the study is given to facilitate the reader's finding particular areas of interest as well as to provide him/her with an overview of the dissertation.

CHAPTER II
REVIEW OF THE LITERATURE

This review of the literature will begin with the most pertinent, to be followed by other related studies and to be concluded with landmark and historical projects. Of most interest to this investigation are those studies dealing with Anglo, Black, and Mexican subjects. Heretofore there has been only one other study in which all three of these particular ethnic groups have been focused on. Therefore, the bulk of the most important literature will constitute Mexican American and Anglo crosscultural cognitive style studies. Let it be emphasized that the above three ethnic groups together comprise the three major cultural groups in America. Hence, the schooling problems of children culturally different from the majority Anglo child are of special interest to the bilingual-multicultural educator. Regarding cognitive style research between Mexican (American) and Anglo subjects, three out of five studies show a difference in the cognitive style of Mexican (Americans) and the Anglos. The two remaining studies that show no cross-cultural difference in learning style indicate the need for further research, such as this investigation has undertaken.

Anglo, Black, and Mexican Research

The 1974 study by Ramirez and Price-Williams has in common with this research the cross-cultural comparison in cognitive style of three different ethnic groups. Ramirez and Price-Williams administered Oltman's Portable Rod-and-Frame Test to 180 fourth grade subjects in Houston, Texas. These Mexican American, Black, and Anglo American children were all from Catholic parochial schools. Sixty subjects were in each ethnic group, and half of each ethnic group were from the opposite sex as well as from the lower and middle socioeconomic classes. These researchers were approaching the problem from the point of view that socialization practices affect cognitive style. In particular, they were relating Cohen's (1969) theories to the development of cognitive style. First, the difference between formally organized and shared-function family and friendship groups that reflect individual versus group identity, respectively, would characterize the hypothesized field independency of the Anglos versus the field dependency of the Mexican and Black children. Second, achievement and intelligence tests used were biased in the favor of the field independent learner. Ramirez and Price-Williams also believed that a lack of consonance between the cognitive style of the schooling institution and the different learning styles of the Mexican American and Black children may contribute to the failure of these group members in the school.

The results of the procedure of Ramirez and Price-Williams were based on the ethnic group means and standard deviations of the Portable Rod-and-Frame Test. In addition, analysis of variance F tests demonstrated significant ethnic group effects and sex effects. There was no significant effect for socioeconomic status, so the authors declared that the results could not be explained by the "culture of poverty." Instead, the lack of a socioeconomic status effect underscored their acceptance of the theory that socialization practices of different cultural groups affect cognitive style.

In critiquing this piece of research by Ramirez and Price-Williams, it can be said that it is unusual but good to see such a carefully designed method in which each group had an equal number of subjects. It was not stated, however, how randomization was achieved, that is to say, how many subjects constituted the original pool from which this carefully balanced selection was drawn. The multi-ethnic approach is noteworthy and has already been commented upon as the first piece of research to use this combination of cultural grouping. Nevertheless, their argument is that the cognitive style of schooling institutions and the Mexican American and Black students' learning style in these environments may not be consonant and, thus, contribute to failure. This proposition is yet to be verified by continued and further research. It could be that the teaching style of the teacher versus the learning style of the student may be a more important factor in low

achievement and failure than the cognitive style of the ethnic group member. Furthermore, the fact that Ramirez and Price-William's research was conducted in a parochial rather than a public school may also be a factor influencing the findings of their research. The fact that the Blacks were French bilinguals of Louisiana extraction is also unusual and tends to establish them as coming from more traditional communities, unlike the Anglos who were monolingual without any dominant Caucasian heritage. Ethnic group differences in cognitive style were nonetheless demonstrated.

Anglo and Mexican American Research

Kagan and Zahn (1975) dealt with cognitive style and its relationship to achievement. The question they posed concerns the issue of low achievement and field dependence of Mexican Americans as compared to Anglo school children. These researchers directly challenged the notion of Ramirez (1972) that the failure of Mexican Americans is due to their field dependent cognitive style and also the conclusion by Cohen (1969) that the school is field independent in style. The method employed by Kagan and Zahn to test their hypothesis about the school achievement gap was to measure 134 second, fourth, and sixth grade children for cognitive style and achievement. The children were all enrolled in a semi-rural southern California elementary public school in a lower socioeconomic area. The school was predominantly Anglo, which accounted for the small and unequal distribution of cell frequencies at the three grade levels. Cognitive style was determined by using the Man-in-the-Frame

adaptation of Witkin's Rod-and-Frame Test. The Achievement measures utilized were the reading and mathematics results of the California school system's administration of the 1970 Cooperative Primary Tests to second graders and the 1968 Comprehensive Tests of Basic Skills to the fourth and sixth graders. A multiple regression procedure was the method of analysis employed due to the continuous nature of the dependent variables.

It was found that the Mexican American children were indeed more field dependent than the Anglos, and that, while field independence was significantly related to reading and achievement, the cultural achievement gap was greater in reading than in math. Therefore, the researchers concluded that Cohen's (1969) assertion that field independence significantly determines school achievement was supported; however, Ramirez's (1972) belief that the field dependence of Mexican American school children contributes to their failure was not explained. In trying to explain the greater cultural difference between reading and math, Kagan and Zahn turned to bilingualism. However, since this group of Mexican American children used mostly English, even in the home, the researchers concluded that, instead, the reading materials and motivational approaches used by the school were not responsive to the different values and experiences with which the Mexican American pupils came to school.

In reviewing Kagan and Zahn's article it can be said that the researchers approached a difficult but important problem, that of the relationship of cognitive style to

achievement. This issue will continue to be debated in the literature, since an answer may lie in continued research designed to build a body of studies related to the problem of failure and low achievement of Mexican Americans in the school. Notwithstanding this issue of concern, central to the investigation is the fact that the researchers did find a difference in learning style even in a predominantly Anglo school setting. The sample of 134 subjects from three alternating grade levels is relatively small, but so was the size of the school: all available subjects in the second, fourth, and sixth grades were tested. Recognizing that measures of cognitive style are sometimes used to predict achievement, the authors cautiously discussed the point that different measures of field independence/field dependence may be measuring different variables, that embedded figure contexts may not be the same as perception of the upright. Hence, variables such as motivation, carefulness, and correctness may be being measured along with sensory perceptions.

Buriel (1975) studied cognitive style among three generations of Mexican American children. At that time he cited three major studies that documented the field dependent cognitive style of Mexican American children relative to Anglo American children. Those three studies include the first two reviewed above (Ramirez and Price-Williams, 1974; Kagan and Zahn, 1975) in addition to an unpublished one by Canavan (1969) in which 956 Mexican Americans and 571 Anglos from grades kindergarten through

six were tested for cognitive style. Canavan found that the Mexican American children were significantly more field dependent than the Anglo children at that school. However, Buriel was studying cognitive style among Mexican Americans cross-generationally, relating it to type of community and length of time in the United States. He measured the cognitive style of Mexican Americans across three generations. To do this he used eighty subjects randomly selected from four populations: twenty first, second, and third generation each of Mexican Americans and twenty more Anglos were used as a fourth comparison group. All were children from second and third grades. The groups were equally divided by sex. Unlike the above study by Kagan and Zahn, the school from which the children were sampled was predominantly Mexican American. It was also a semi-rural public school in southern California.

In Buriel's study the subjects were all administered the Man-in-the-Frame box test for cognitive style. Statistical analysis was carried out by means of analysis of variance with F tests, means and standard deviations reported. The principal hypothesis tested in the study was the increasing field independence of the Mexican Americans from the first to the third generation. However, the results indicated a curvilinear relationship as opposed to a linear one, with the second generation turning out to be the most field independent of the three. Of all the groups the Anglos were the most field independent, followed by the second, first, and third generation Mexican Americans.

Furthermore, in all groups the females scored more in the field dependent direction. An explanation for these results was discussed in terms of selective migration and community acculturation processes. Individuals migrating to the United States were probably more field independent than the type of person who would prefer to remain in Mexico and not migrate. However, once the immigrants settled in the United States they probably preferred to live in more traditional communities that are characterized as relatively more field dependent (Ramirez and Castaneda, 1974).

While Buriel's explanation of a relatively more field independent individual as being the type of person that is more likely to migrate is not verified by his research, there is evidence that dualities such as these are related to cognitive style. Witkin and Berry (1975) summarized much of the cross-cultural research on psychological differentiation and found a clustering of factors that dichotomized the dimensions of field independence/field dependence for two different less technologically developed types of societies. On the one hand are the higher differentiated or more field independent migratory hunters and gatherers while on the other are the lower differentiated or more field dependent sedentary agriculturalists and pastoralists. If migratory and sedentary are the key characteristics differentiating these two basic social orders, then Buriel's observations are credible. Furthermore, Okonji (1969) differentiates between rural and urban upbringing and their relationships to

cognitive style: rurality clusters with the field dependent dimension while urbanity clusters with the field independent dimension of cognitive style.

A second study by Buriel in 1978 was even more significant than his first. He used a multi-method approach to assess cognitive style in Mexican American and Anglo children. Of major interest to this research is that the results of Buriel's study turned out to be conflicting. The Mexican American children did not prove to be more field dependent than their Anglo counterparts. Furthermore, the intercorrelations between the three measures of field independence utilized were not comparable or significant for both cultural groups. In addition to field independence Buriel was also interested in whether or not this construct related to school achievement. He reported that, according to his study, field dependence was not substantially important to the school achievement of Mexican American children. The claims of Buriel's study were based on the following research. Forty children from each cultural group were further divided into four groups of ten from grades one through four. These groups were in turn equally divided by sex. All subjects were from the same predominantly Mexican American semi-rural public school in southern California and were of lower socioeconomic background. All of the children were individually administered the Man-in-the-Frame version of the Portable Rod-and-Frame Test, the Children's Embedded Figures Test, and the Wechsler Intelligence Scale for Children Block Design Subtest. Reading and mathematics

achievement measures were taken from previously administered group scores from the Metropolitan Achievement Tests. The data was analyzed using multiple regression procedures to deal with the continuous nature of the dependent variables.

Notwithstanding the fact that Buriel was unable to substantiate any of his research hypotheses, he believed that his study had the following import. For studies investigating the relationship between field independence and achievement, his was the first one to use a multi-method approach. To explain the conflict between studies that are able to find a cross-cultural difference between Mexican Americans and Anglos, he suggests that cognitive differences may be a function of the particular instrument used. He goes on to state that the difference between the results of the various instruments may be due to a difference between the Mexican Americans and the Anglos in the meaning of field dependence. Buriel also critiques the use of the Man-in-the-Frame Test by stating that it may only have face validity for the Portable Rod-and-Frame Test since it has never been empirically validated against the original Rod-and-Frame Test designed by Witkin. In addition, Buriel is aware that contextual factors may have influenced the results of his study. All of the cognitive style tests were individually administered, although by different persons, whereas the achievement scores were taken from a group test that had been administered for a different purpose. Although the results of this study caution Buriel from overstating the relationship between cognitive style, i.e.,

field independence, and achievement, he does not exclude the possibility that the two constructs may be unrelated. This conclusion causes him to further caution against the use of instruments for measuring field independence/field dependence by federally funded schooling programs to predict achievement.

The rejection of the research hypotheses by Buriel in this unique study using a multi-method approach is indeed puzzling as it adds to the literature in Mexican American cognitive style studies that produce conflicting results. Despite the relatively small number of 80 subjects in the total study, all were randomly selected. First generation Mexican Americans had been eliminated so as to not include bilinguals who might have a limited knowledge of English. Grades one and two and grades three and four were grouped together in the data analysis because of the practice in the school of combining grade levels. The means and standard deviations as well as F tests and correlations were then reported for the three tests of cognitive style and for reading and mathematics achievement. Still there was no evidence that the school achievement gap, as Kagan and Zahn called it, was related to field independence/field dependence.

That Buriel's findings and conclusions add to the conflict in the literature by suggesting that the cognitive style of Mexican Americans is not different from their Anglo counterparts is one issue. Another issue is the failure of Humphreys (1980) to replicate the statistical procedures

employed. Humphreys criticized the statistics reported in Buriel's 1978 study. Basically the problem is as follows. Frequently researchers, such as Buriel in the above study, will base their conclusions on comparisons of the mean differences, whereas the proper statistic to compare is the difference between the mean differences themselves. Furthermore, Humphreys adds that the small size frequently interferes with the rejection of the null hypothesis. By increasing the statistical power through increased sample size this difficulty can also be overcome. Although Buriel's 1978 statistics fail to replicate, it is good to know where the error lies and what steps can be taken in order to solve the problem.

Another study that was printed in 1978 was an investigation by Rivas. This was her dissertation in which she studied the cognitive styles of 120 Mexican American and Anglo children. Her study dealt with two different cognitive style dimensions: reflection/impulsivity and field independence/field dependence. The total group was divided equally into sub-groups of 60 Mexican Americans and 60 Anglos. These groups were further divided into two levels of sex and three levels of age for five, eight, and ten year olds. The Matching Familiar Figures Test, a measure of reflection/impulsivity, and the Children's Embedded Figures Test, a measure of field independence/field dependence, were individually administered to each subject. Analysis of variance was the statistical method employed to analyze the data. In using Scheffe post hoc procedures to

identify the significant mean differences, the researcher found no difference in either cognitive style dimension for either cultural group. Acculturation to the majority norms was her explanation for the lack of difference since her sample was selected from a midwestern urban community. Rivas felt that her study did not, however, invalidate the work of Ramirez and Castaneda (1974), who found Mexican Americans in a traditional community to be more field dependent than Anglos. The urbanization and resultant acculturation of her sample was also within the framework of Witkin and Berry's (1975) extended theory of psychological differentiation.

Notwithstanding the acceptance of her null hypothesis in which no cross-cultural cognitive style differences were demonstrated for the Mexican Americans and Anglos sampled, Rivas was able to support the notion of a developmental trend for both cognitive style dimensions studied. Her results indicated that the older children were indeed more field independent and more reflective than the younger ones.

In critiquing her own work Rivas explains that her sample was not random due to the limited number of Mexican Americans subjects available for testing. She realizes that generalizability of the results may be limited, but she does not address the fact that her sample, while it may indeed be the population, could be representative of other urban industrialized communities where Mexican Americans constitute a minority. In this same fashion her concern for the lack of better control for socioeconomic status other

than eligibility for free lunches and milk may have been unwarranted. The school's gross participation in programs sponsored in behalf of the needs of a lower socioeconomic community may be just as revealing as an instrument that invades one's privacy to determine socioeconomic status for research purposes. For reasons such as the above, where the emphasis in research is on the contextual framework from which data are collected, the supposed limitations of a study can be reversed to propose a greater generalizability.

Related Research

The above five studies are the major research efforts that are most similar or directly related to the investigation of this dissertation. The next group of four studies are also related to this research topic; however, since they focus more on other topics while including cognitive style as a major emphasis, they shall be included as related research that is pertinent to this study.

Sanders, Scholts, Kagan (1976) looked at field independence/field dependence along with three social motives in both Anglo and Mexican American children. The social motives of principal interest were achievement, affiliation and power motivation. These three social motives were given an index. Field independence was scored by means of the Man-in-the-Frame Test. A total of 184 fifth and sixth graders from a semi-urban school in a lower income area of southern California were tested. Although divided by ethnic group, sex, and grade level, the cell frequencies

were unequal. Analysis of variance procedures resulted in the Anglo children demonstrating significantly more field independence. These authors concluded by cautioning the acceptance of the notion that field dependence is related to a greater social orientation. This conclusion was based on the fact that their research was only able to confirm the relationship between field independence and achievement. No relationship was established between field dependence and affiliation. This caution is justified because these researchers are cognizant of Ramirez and Castaneda's (1974) theory that field dependence, or field sensitivity as these theorists call it, is described in terms of socially oriented behaviors. Sanders et al. believe that as a result of their study the field independence/field dependence construct is more related to task concerns rather than social concerns. That is to say, they are emphasizing the cognitive aspects of field independence/field dependence in their report although it has earlier been noted that Witkin defined and described the construct as also being related to personality traits and characteristics (Witkin et al., 1977a). Therefore, the criticism of Ramirez and Castaneda's theory is justified as a caution in need of further specific research on the issue.

The theoretical notions of Ramirez and Castaneda again come into question in the research of Kagan, Zahn, Gealy (1977). Kagan et al. studied measures of competition, individualism, field independence, and school achievement in 230 Mexican American and Anglo children. (It should be

noted that this research by Kagan et al. as well as the above study by Sanders et al. were motivated in part by the findings of Kagan and Zahn (1975) wherein the school achievement gap of Mexican Americans was thought to be related to their relative field dependence.) By using experimental games, Kagan, Zahn, and Gealy concluded that Mexican Americans, with a less competitive social orientation, were not necessarily disadvantaged with regard to school achievement. Fourth and sixth graders were administered the Man-in-the-Frame Test, and the kindergarten and second grade children were given the Children's Embedded Figures Test to measure cognitive style. Multiple regression techniques were used to analyze the data.

It was found that fourth and sixth grade Anglo children were significantly more field independent, but no significant cultural difference was demonstrated in the lower grades. In this study, a significant relationship between field independence and school achievement was established for all grades except the second. Since field independence and competitiveness did not correlate significantly, the authors concluded that these two variables reflected two distinct cultural differences rather than two manifestations of one underlying difference. Therefore, they questioned the speculations of Ramirez and Castaneda (1974) that cooperation in Mexican American children is related to field dependence. The authors make this assertion by explaining the cultural differences between Mexican American and Anglo children in terms of

field dependence and achievement, which they claim were related to the cultural domain, whereas the contrasted cooperation and affiliation characteristics belong to the social domain. This clustering differs from the preceding study in that cultural and social domains are contrasted whereas, above, Sanders et al. (1976) opposed the cognitive and social domains.

Kagan, Zahn, and Gealy (1977) reach the same conclusion as Sanders et al. (1976), namely, that Ramirez and Castaneda's (1974) theory lacks empirical data and requires more precise research. However, criticism of Kagan, Zahn, Gealy (1977) can begin with the instruments used to measure cognitive style. It has already been noted by Buriel (1978) that the Man-in-the-Frame Test may only have face validity since it has never been empirically validated against Witkin's original Rod-and-Frame Test. Furthermore, two different measures of cognitive style were used in Buriel's study for two different age groups. For the younger children it may have been a better choice to use the Preschool Embedded Figures Test, since the Children's Embedded Figures Test was designed primarily for older elementary subjects. To be sure, the social nature of field dependency is an important issue which will become apparent in the methodology of this investigation. The very instruments designed by Ramirez and Castaneda (1974) as the product of their research findings and observations will be scrutinized herein as they are tested in the field.

Kagan (1974) studied field dependence and conformity in sixteen rural Mexican children and sixteen urban Anglo children, all between the ages of seven and nine years. Field independence/field dependence was measured once again by the Man-in-the-Frame Test. Although both cultural groups were equally divided by sex, no significant sex difference was found in the results. However, the Mexican subjects proved to be more field dependent than the Anglos. Perhaps the sample of 32 was not large enough to be more sensitive to sex differences, whereas the difference between rural and urban children would be enough to be demonstrate differences in cognitive style cross-culturally. In addition, it should be noted that this study was conducted in both Mexico and the United States, the sample being selected from two different geographical areas. In all of the other studies cited heretofore, samples were taken from a single population such as a school.

The fourth study in this group was conducted by Knudson and Kagan (1977) who looked at role-taking along with field independence between Anglo and Mexican American children. Ninety-seven children of two age groups were measured (five to six and seven to nine years old) using the Children's Embedded Figures Text. The sample came from a semi-rural public school, predominantly Anglo, in a lower-income area of southern California. The findings of this research are included among those that are contradictory to theory in that the Anglo children did not prove to be significantly more field independent than their Mexican American

counterparts. However, consistency by sex was shown when the males were found to be significantly more field independent than the female subjects. Role-taking and field independence were both shown to be developmental variables.

Several other pieces of research relate to this review of the literature by also relating cognitive style to acculturation factors and child rearing practices. In addition, one of these articles bears directly upon one of the above-cited studies. The first study of this latter group by Knight, Kagan, Nelson, and Gumbiner (1978) questions Buriel's (1975) findings regarding acculturation across three generations of Mexican Americans. Buriel had found the relationship between generations and field independence/field dependence to be curvilinear, with the second generation being the more field independent of the Mexican American groups. Knight et al. (1978) suggests two possibilities to explain Buriel's (1975) findings: that acculturation may be either behavior-specific or sample-specific. The community sampled by Buriel is considered to be from a relatively isolated rural area. Therefore, Knight et al. (1978) proposed to sample a community in southern California that had previously been studied by Knight and Kagan in 1977.

In this 1978 research by Knight et al., 144 Mexican American and Anglo children from grades four, five, and six in the same lower socioeconomic elementary school were administered measures of locus of control, self esteem and field independence/field dependence. The subjects were

further divided by sex and generation with a fairly even distribution of subjects across generations. The Man-in-the Frame Test was used to determine field independence/field dependence, resulting in the finding that the third generation was more field independent than the second generation. Likewise, the older sixth grade children were progressively more field independent than the fifth and fourth graders. Hence, Buriel's (1975) findings were discussed as sample-specific due to the nature of the particular community he studied, and not as a general description of the behavior of acculturating Mexican Americans. These authors also concluded by placing field independence (and achievement) in the cognitive domain while separating competition into the realm of the social domain. Sanders et al. (1976) also clustered field independence/field dependence into the cognitive domain whereas Kagan, Zahn, Gealy (1977) placed the construct within the cultural domain. Obviously, researchers have reached no final conclusion as to the all-pervasive nature of cognitive style as it relates to personality and social characteristics.

This next study by Ramirez, Castaneda, and Herold (1974) looks at the relationship of acculturation to cognitive style in Mexican Americans from three different types of communities. It is the research from which Ramirez and Castaneda (1974) base their thinking in regard to community type: traditional, dualistic, and atraditional. Theoretically, the traditional community is more field

dependent; the dualistic community could be placed at either pole of the construct; and the atraditional community type is typically more field independent as it reflects the largest degree of acculturation.

For this particular project Ramirez, Castaneda, and Herold selected 541 children from grades one, four, and six along with their mothers. Each grade level was approximately divided by sex and lower and middle socioeconomic status. The subjects came from three different southern California communities that were representative of the three characterized community types. Cognitive style was measured in the children by means of the Portable Rod-and-Frame Test, while the mothers were interviewed in the home and given the Human Figure Drawing Test and two questionnaires concerning socialization and values. The data were processed by a multi-variate analysis of variance followed by Tukey's test for post hoc comparison of the mean differences.

The results indicated that females and younger children were more field independent. Socioeconomic status did not prove to be a significant variable. Of greatest importance was the finding that the traditional community was, indeed, the most field dependent of the three. The lack of homogeneity among the Mexican Americans studied suggests the relativity of acculturation. Community type must be taken into consideration to explain the degree of field independence/field dependence attributed to a particular ethnic group.

A criticism of this 1974 study is that the same measure of cognitive style could have been given to the mothers, although bringing such an apparatus into the home during the interview was surely a consideration for not doing so. This criticism is made due to the multi-method nature of the investigation being reported in this dissertation.

A recent study by Laosa (1980) emphasizes maternal teaching strategies and their relationship to cognitive style in Chicano families. Child rearing was investigated by observing 43 mothers and their five-year-old children from a range of socioeconomic levels. The kindergarten subjects were selected from two Los Angeles public schools. Maternal teaching was observed for nine different dimensions using a technique developed by Laosa. Cognitive style was measured in the mothers by the Embedded Figures Test, the Wechsler Adult Intelligence Scale Block Design Subtest, and the Human Figure Drawing Test. Pearson correlations and distribution-free methods of statistical analyses were performed on the data. Results indicated that the mothers who were relatively field independent used teaching strategies such as inquiry and praise, whereas relatively field dependent mothers employed modeling. In either case the child tended to develop the cognitive style of the mother. Other important findings include that the data established the construct validity of cognitive style for Chicano women studied. Furthermore, age five was found to be the age when this construct emerges in Chicano children.

Criticism of this work begins with the fact that correlations are generally low and not highly consistent across the different measures of cognitive style. The study is an example of a multi-method approach to cognitive style research with very young children. The Preschool Embedded Figures Test would have been better for children of age five.

The Human Figure Drawing Test might also present some difficulty for young children; however, the administrator established a consensus on the scoring of the drawing, so this problem was eliminated. Goodenough and Eagle (1963) suggest the age of eight as the time when learning style is clearly determined. Therefore, the emergence of cognitive style in Chicano children at the age of five is early. This implies that the school could be the deter- mining factor in the stabilization of cognitive style in developing youngsters. All findings in Laosa's study are read in terms of Chicano subjects, which allows for cross- cultural variation in the emergence of this ontogenetic construct. The higher intercorrelations for girl subjects were interpreted as the earlier emergence of cognitive style in females than in males. This is one of the few studies in which the relationship of child-rearing practices is related to the cognitive style of Chicano subjects.

The next two studies that will be briefly reviewed were conducted in Mexico with school children to determine differences in cognitive style. The difference between research with Mexicans in Mexico and Mexican Americans in

the United States is that the Mexican subjects turn out to be more field dependent than Mexican American subjects, who may or may not be relatively more field dependent. That is to say, the results of a study may reflect the culture of a particular locale more than any genetically determined differences in cross-cultural cognitive style. The ambiguous findings of cognitive style differences between Mexican Americans and Anglos may be more accurately interpreted by including research that shows a difference in the cognitive style of Mexicans when they are studied in their native country. The pattern of the acculturating immigrant and that of the established Mexican American reflects a cognitive style that may be different from their Anglo counterparts, but not necessarily significantly different.

Mebane and Johnson (1970) explored the questions of sex differences in cognitive style and the relationship of child-rearing practices to cognitive style when they measured field independence/field dependence in 87 Mexican school children by administering the Children's Embedded Figures Test and the Draw-a-Person Test to them. These were fifth grade boys and girls from a working-class neighborhood in Monterrey, Mexico. Witkin's sex hypothesis was verified in that the Mexican boys were found to be more field independent than the Mexican girls. Furthermore, the means of the Mexican girls were compared to those from published data for Anglo girls from the United States. The Mexican girls were found to be the more field dependent of the two.

However, there was no significant difference between the data comparing the Mexican boys with their Anglo counterparts. These comparisons were made using the data from the Children's Embedded Figures Test. No significant difference was found for boys and girls using the data from the Draw-a-Person Test. Nevertheless, the Children's Embedded Figures Test correlated with the Draw-a-Person Test positively for boys and girls (.42, $p < .05$ and .43, $p < .05$ respectively). Although these correlations were positive and significant they were not high, indicating that the two particular measures employed to measure field independence/field dependence might not be quantifying the same dimensions. Whether or not two or more different measures of cognitive style are measuring the same ability is a question that must be asked when a multi-method approach is used, especially if the correlations are not high and if significant differences are not found between the means for the various instruments utilized.

Ramirez and Price-Williams (1974) compared the cognitive styles of 136 Mexican children from two different Mexican communities. Ahualulco de Mercado in Jalisco was chosen to be representative of a more traditional Mexican community, while Mier, Tamaulipas, was considered to be less traditional since it was closer to the border between the United States and Mexico. That Mier was considered a community more influenced by American values was determined by the fact that many fathers were absent from their homes and frequently employed in the United States. All the

Mexican school children subjects were selected from Catholic homes that represented the various socioeconomic levels of the community. Their mothers, in turn, were also interviewed and administered socialization questionnaires that were testing for field dependent socialization clusters in children-rearing practice. The children were each administered the Portable Rod-and-Frame Test and were separated according to age and sex into small groups of 17 each for ages 9-11 and 13-15 for males and females respectively.

The hypotheses concerning cognitive style were all confirmed: the children deep in the interior of Mexico were significantly more field dependent than those closer to the border; the females were more field dependent than the males; and the younger subjects were also more field dependent than the older ones. The scores of the children were also compared with those in previous research of Anglo children from the United States. These results further indicated that the Mexican children were comparatively more field dependent than their Anglo counterparts. The results of Ramirez and Price-Williams were similar to those obtained by Mebane and Johnson (1970), who had previously tested for cognitive style in yet another Mexican community.

While this study by Ramirez and Price-Williams focuses on community type and socialization practices, it affords a close look at intra-Mexican cognitive styles. Whereas it is not always possible to demonstrate cognitive style differences between Mexican Americans and Anglos within the

confines of the United States' borders, the cross-cultural learning style differences are more consistent when researched internationally. Only one instrument, the Portable Rod-and-Frame Test, was used to measure field independence/field dependence. However, since the emphasis of the study was on community type, the one cognitive style measure was not inadequate, although the sample that represented the various economic groups may have been small. A total of 68 school aged children were tested from both communities. The pairing of the school children with their mothers made the sample seem twice as large notwithstanding the fact that there was an equal number of subjects in each group. The practice of comparing Anglo norm data from a previous study provided consistent results with cognitive style theory and is an accepted research procedure.

Geographically Related Research

As cognitive style research becomes more widespread the variety of ethnic groups on which data are collected increases. In addition, more geography is included which serves as an important research variable. For this reason two recent dissertations (Halverson, 1976; Mylonas, 1981) are included in this review of the literature because of the geographic region in which the studies were conducted. The bilingual schooling problems particular to Florida include a variety of ethnic groups. One such study dealt with Seminole Indian children, the other with Greek-Americans.

Halverson (1976) compared 44 Seminole Indian children from three reservations in south Florida with 44 Anglo children from Tallahassee. The subjects were all three and four year old pre-school children. The subgroups for analysis were unequal in composition, although age, sex, and ethnic groups were the independent variables considered. Socioeconomic status was not controlled, since the Anglo comparison groups utilized were of middle class origin. The researcher did, however, use two different measures of cognitive style: the Portable Rod-and Frame Test and the Preschool Embedded Figures Test that was developed by Coates (1972) for measuring the field independent/field dependent construct in the very young.

Although the three different reservations from which the data were taken in Halverson's study differed in degree of acculturation, the Seminole children were not significantly different from the Anglo control group. Nevertheless, Halverson admits that the sample was too small to make any broad generalizations. She further criticizes the instruments used to measure cognitive style by stating that they did not correlate significantly. This researcher suspects the same as other critics of cognitive style instruments, namely, that the various measures constructed may tap other perceptual factors in addition to the purported field organization which they were designed to quantify.

A second dissertation (Mylonas, 1981) involves a comparison between Anglos and Greek-Americans in Florida and

New York bilingual school programs. There were 300 subjects from grades one through four that were tested for cognitive style, bicognition, and language dominance. The Children's Embedded Figures Test was used to measure field independence/field dependence, the Child Rating Observable Behavior Inventory was employed to determine the number of bicognitive students, and the Michopoulos Test of Greek-English Language Dominance/Proficiency was utilized to identify language proficiency.

Mylonas' findings indicate that there were no significant differences between Greek-American children attending bilingual and monolingual programs with regard to cognitive style. Furthermore, Greek-American females were not more field dependent than their male counterparts. However, the above results are based on the Children's Embedded Figures Test. With the bicognitive measure there were significant differences between the ethnic groups compared in and out of bilingual programs, although no age and sex differences were found. The importance of the bicognitive measure is that it is the same instrument being used in this dissertation, but with a different purpose and a different name.

This researcher is using the Child Rating Observable Behavior Inventory as an observational instrument to determine field independence/field dependence, while Mylonas has employed the same instrument to identify bicognition. This researcher used this instrument as a checklist, whereas Mylonas considered it an inventory. The two distinct usages

are not necessarily incompatible, given the nature of cognitive style instruments discussed earlier. All other such instruments measure the extent to which an individual is field independent. Ramirez and Castaneda's rating forms are the first attempts to get at field dependence as a separate but equal construct. For that reason this researcher insists on enumerating both cognitive styles each time they are spelled out, i.e., field independence/field dependence.

Landmark Research

The recent major cross-cultural longitudinal study by Holtzman, Diaz-Guerrero, Swartz (1975) mentioned in the introduction will conclude the review of the literature pertinent to this investigation into learning style differences. Actually, personality, rather than cognitive style was the focus of their study. However, any comprehensive study of personality would be sure to include cognitive style as one of the elements to be considered. For that reason only the principal findings about cognitive style from their longitudinal study are summarized.

Once again it must also be pointed out that the school children measured were Anglos from Austin, Texas, and Mexican boys and girls from Mexico City. All testing was conducted over a period of six years in which three overlapping groups were defined. Group I consisted of grades one through six; Group II included grades four through nine; and Group III overlapped from grade seven through twelve. Some 300 largely middle class school

children throughout the public schools in Austin were selected as subjects. A comparable group of another 300 subjects were selected in Mexico City, although this group was more difficult to control for socioeconomic class and type of school than their Anglo counterparts. The researchers settled for establishing subjects who would be available for testing for six years as the study was designed. Included in the battery of psychological tests administered to the subjects were measures of cognitive style other than for the field independent/field dependent dimension. Because of the overlapping age groups, not all subjects could be administered the same cognitive style measures of field independence/field dependence. Actual instruments employed included the Human Figure Drawing Test, the Wechsler Intelligence Scale for Children Block Design Subtest, and the Embedded Figures Test. Emphasis was placed on the Embedded Figures Test as the main instrument measuring psychological differentiation as it was originally theorized, researched and developed by Witkin.

The major finding regarding learning style was that, although there were statistically significant differences between the cognitive styles of the Anglos and the Mexicans, by year five in the testing the convergence of the two cultures no longer resulted in a significant difference between any of the scores of the Mexican and Anglo children that were analyzed. It should also be pointed out that this study attempted to correlate cognitive style with socialization practices; however, the items in the parent

interviews were not robust enough to be included in a proper correlational study, leaving the socialization data to be analyzed separately.

Summary

While the longitudinal study of Holtzman, Diaz-Guerrero, Swartz (1975) focused on personality development, it must be credited as the first attempt to investigate longitudinal differences between Anglos and Mexicans regarding field independence/field dependence. Any lack of controlling for independent variables must therefore be tempered with the impact of the study as it was originally designed. Data were collected for some 600 school children over a six year period. The basic finding that there was, indeed, a difference in cognitive style is consistent with other short term research where Anglos in the United States and Mexicans in Mexico have been compared.

The inconsistencies in cross-cultural studies between Anglos and Mexican Americans in particular occur when differences in learning style are sought between the various ethnic groups here in the United States. Of the studies cited in this review of the literature, most show a difference, while a few show no difference in cognitive style. The trend suggests that Anglos are relatively more field independent and that the Mexican Americans are relatively more field dependent. This trend is in keeping with theory. However, the influence of contextual and geographic factors on the data suggests a relativity in

cognitive style that is also in keeping with Witkin's original notions regarding the construct of cognitive style. Field independence/field dependence, although pervasive characteristics, are relative tendencies, not absolute dimensions of the personality (Witkin et al., 1977a). For that reason an isolated quantified measure of cognitive style has little import in itself. It is only in relation to other measure scores that a meaning can be attributed to a particular number generated. A couple of examples were given of research in Mexico in which Anglo normed scores were compared to the recently tested Mexican subjects and significant cross-cultural differences were found. This procedure is acceptable in research in general; nevertheless, cognitive style research is dealing with a relative construct. This relativity of field independence/field dependence as a dimension should be a caution in evaluating the results of all research with this construct in order to avoid biased interpretations.

CHAPTER III
METHODOLOGY

This chapter spells out the methodology used by this investigator to design the research project, to collect the data, and to process and analyze the data in order to identify the cognitive style of children in a rural bilingual school. Basically, this study utilizes a multi-method approach employing a repeated measures design (Glass and Stanley, 1970) in which three measures of cognitive style are taken on each subject using three different instruments. Two of the measures taken are from psychological tests of perception. These two instruments measure field independence/field dependence. The third instrument involves a different approach for determining cognitive style. Being a checklist of observable behaviors for field independence and field sensitivity (Ramirez and Castaneda, 1974), this instrument is observational rather than psychological in orientation. Its approach attempts to overcome some of the inherent de- ficiencies of the more traditional psychological instruments measuring field independence/field dependence, although it presents other problems in the process The repeated mea- sures design, therefore, uses two different approaches for collecting data. For purposes of analyzing data, the sta- tistical procedures of analysis of variance and chi-square tests are employed to determine whether the

differences between the three ethnic groups measured are significant. Furthermore, the multi-method approach necessitates a correlational study of the instruments used in order to determine their reliability. The three ethnic groups sampled from the rural school population were Anglos, Blacks, and Mexican migrant children. The presence of the Spanish-speaking Mexican migrant children defined Seville and Pierson as bilingual schools.

Hypotheses to be Tested

The nature of this study and the hypotheses to be tested present a set of variables that relate to the context of the literature review on cognitive style and Mexicans or Mexican Americans. Four main hypotheses are tested in this repeated measures design:

1. There are no differences in cognitive style among Anglo, Black, and Mexican ethnic groups.
2. There are no differences in cognitive style between males and females.
3. There are no differences in cognitive style among grade levels for third through sixth grades.
4. There are no correlations among the measures of cognitive style.

Therefore, the independent variables include males and females for sex and levels three, four, five, and six for grade under the classifications of Anglo, Black, and Mexican. The dependent variable or outcome of interest is cognitive style. In this case cognitive style refers to field independence or field dependence (or field sensitivity

in the case of the third instrument of observable behaviors). The Children's Embedded Figures Test measures the extent to which a person is field independent; therefore, this dependent variable is continuous. Likewise, the Perceptual Acuity Test attributes a higher score to field independence, therefore defining this dependent variable as continuous also. On the other hand, the Child Rating Forms of Observable Behaviors are actually two separate checklists. When these behaviors are rated as frequencies, it is possible to determine continuous variables as well. However, for purposes of this research, the checklists were used to identify preferred or dominant cognitive styles. Therefore, this instrument set was used to establish a categorical variable or label as the outcome of interest.

The principal question to be asked, as established by the literature review, is: Do the Mexican subjects have a cognitive style different from the other children in the bilingual school? If so, what are the implications for bilingual education? If not, why are their learning styles similar to their Anglo and Black counterparts? Furthermore, because of the history and background of the construct of cognitive style, it makes sense to ask if there are any differences due to sex, since this variable relates to child rearing and socialization practices. Likewise, the developmental nature of the construct can also be studied by looking at age or grade level, as the case may be. Here grade level was chosen to investigate the question of

whether cognitive style is developmental. The repeated measures design using a multi-method approach requires a correlational study of the instruments employed. Since the purpose of this research is to identify cognitive style, the question of the reliability of the particular instruments used becomes a paramount issue. If the instruments strongly correlate, then reliability is not a particular problem. However, the lack of correlation would generate more issues and beg more research.

Selection of Site

With the selection of the research site, namely, two rural sister elementary schools in north central Florida, the geographic location of the study was determined. Originally only Seville Public School had been selected because it served a bilingual population which included Mexican migrant children. After initial visits to the school were made it became apparent that the Seville population alone was too small. Therefore, Pierson Elementary School, a second school, was included to increase the power of the investigation with more subjects. It was appropriate to use both schools and study the two groups of students as one since the population is homogenous. The two schools are spaced about five miles apart and serve many of the same extended families. On the school level it can be said that the original school, Seville, is a bilingual school, not only because of the population it serves, but also because it houses a bilingual program for the entire community. It is a feeder school for the bilingual needs of the minority

migrant children in the area, which is itself subject to change due to the patterns of migration reflected in school attendance. Consequently, a few teachers and staff, especially bilingual personnel, are shared by the two schools, furthering their relationship to each other.

Selection of Subjects

The selection of subjects to be tested for cognitive style was determined in part by the types of instruments appropriate for a given age level. The grade span that could be covered by the Children's Embedded Figures Test, the Perceptual Acuity Test, and the Child Rating Forms for Field Independent/Field Sensitive Observable Behaviors included grade levels three through six. The final selection of subjects came to be all those students available for testing with all three instruments in grades three through six. The 272 students selected and tested included 139 males and 133 females of which 175 were Anglos, 50 were Blacks and 47 were Mexicans, and of which there were 63 third graders, 77 fourth graders, 72 fifth graders and 60 sixth graders. Therefore, all students in the classroom were tested for cognitive style and included in the study if they did not move away or were absent from any of the measurements. The range of student intelligence in the classroom included those students labeled Learning Disability to Gifted. This appeared to be a normal spectrum of intelligence in the public classroom and was the only control for intelligence in the study. Any student with severe retardation or emotionally handicapped problems is

bussed to another center designed to handle such cases. The mainstreaming of all special students who can be served by the regular classroom offered to the study a range of student intelligence that is comparable to the world and community surrounding the school. Gifted students were given the option of attending special classes of enrichment. No teacher questioned the placement of a gifted child in the regular classroom. The presence in the classroom of a gifted child with higher intelligence assured that all ranges of intelligence were represented. Otherwise ability spectrums within the normal classroom would not have been complete without the inclusion of the Gifted. Furthermore, no teacher claimed to have a gifted child for which they were unprepared to teach and deal with in the course of the normal classroom. For these reasons the researcher was satisfied that a normal range of intelligence was being represented in the classrooms of these schools.

To control for socioeconomic level, no special selection of subjects was used. It was determined by the setting of the school and community that the area could be considered a lower socioeconomic level. Both schools qualified for numerous specially funded programs from all levels of government including school lunch and migrant programs. The community, largely agricultural and utilizing migrant labor, is a poor rural area that has landowners and other people, to be sure, but it is still economically representative of lower income folks. The schools are both older physical plants requiring constant repairs and

improvements. Looking like the majority of students that they serve, the schools appear to be lower socioeconomic settings rather than middle class in comfort, adornment, cleanliness, and function. The few middle class students who attended these public schools were not sorted out from those of lower socioeconomic backgrounds, thereby leaving a normal range of socioeconomic levels within the classroom to be tested for cognitive style. Once again let it be said that these schools are considered lower socioeconomic class by district definition of school qualifications for funding and programs for the special needs of socially and economically disadvantaged students.

In the same vein, the representativeness of these two rural schools also includes a natural control for discipline as well as socioeconomic level. It was the hope of the researcher to be able to observe and test the subjects within an environment of minimum social disruption and aggression. The space afforded by these rural schools provides a natural outlet for student aggression and hostility on the playground. Teachers who had taught in both urban and rural schools were in agreement with this observation. This is not to say that no student discipline problems exist, but they are minimal ones. Fear for safety and anticipatory anxiety were not burdening problems of social control within these schools. Therefore, these schooling environments were not only pleasant but safe. The natural control for discipline provided by these rural schools established a normal and routine environment for

all. The tranquility of a rural school made it easier to deal with staff and personnel and to work with all of the children selected for testing and observation.

Instrumentation

In an attempt to make the administration and interpretation of standardized tests uniform and rigorous, the American Psychological Association (1974) came out with its Standards for Educational and Psychological Tests. It is with this notion of rigor that the researcher strove to take the measurements of cognitive style from the school children selected for research.

Children's Embedded Figures Test (CEFT)

The Manual for the Children's Embedded Figures Test (Witkin et al., 1971) explains the procedures for test administration as well as gives background information on test development, scoring, norms, and data on reliability and validity. This same Manual also serves for the Group Embedded Figures Test (GEFT) and the original Embedded Figures Test (EFT) with which the Children's Embedded Figures Test (CEFT) is compared to check for validity. In fact, according to the Manual all CEFT comparisons have been made with the EFT and not the rod and frame type of instrument. However, the correlation between the WISC Block Design, Object Assembly and Picture Completion Subtests and the CEFT is significant. Furthermore, let it be reiterated that although the construction is different, the primary difference between the EFT and the CEFT is not in concept but in age range: the EFT is too difficult for younger

subjects in the elementary school. Nevertheless, even the authors of the Manual agree that validation data for the CEFT are incomplete and need to be extended; hence, they recommend using the CEFT only for research purposes.

The instructions for administering and scoring the Children's Embedded Figures Test are general and intended to serve as a guide for test users. The reason for the instructions being general has to do with the more important task of the test administrator's ascertaining whether a child understands and is ready to perform the required task. The following is a description of the test materials and the procedure delineated by the authors to administer the CEFT individually to elementary subjects.

The test materials begin with two heavy cut-out forms which the authors have called a TENT and a HOUSE for identification purposes. These are the two shapes that the subjects are asked to disembed one at a time from a series of complex figures.

The complex figures are presented as a series of 38 plates in which pairs are placed back to back (in clear plastic envelope covers for protection) with sequence numbers in the upper right corner. The set begins with a discrimination series. There are four plates in the discrimination series for the TENT and another four cards for the HOUSE shape. Beginning with the TENT series, the object of the discrimination cards is to teach the subjects the shape for which they will be looking: Of the four designs on each of the four discrimination cards three are

dissimilar and one is obviously similar. For example, by the time the child has proceeded through these four cards the examiner will have determined if the child knows the exact shape and size for which he/she will be searching and the orientation of that shape on the plate. The TENT which the child is disembedding is a triangle of a particular size, shape and orientation.

The demonstration series follows next and exists only for the TENT test series and not for the HOUSE test series. These two cards present three incomplete figures of increasing complexity in which the subject locates the shape of the TENT.

Now the subject is ready for the practice series of which there are two practice illustrations for the TENT and one for the HOUSE. The purpose of these plates is to illustrate to the child the procedure for the remainder of the test. The single complex design used to practice for the shape of the HOUSE figure is sufficient to orient the subject to the second series of more difficult embedded designs. The two plates used for the beginning TENT series give the subject confidence as the examiner begins to keep score unofficially.

The actual test series consists of 11 complex figures in which the subject attempts to locate the simple triangular form of the TENT and of another 14 embedded figure designs in which the subject searches to find the simple geometric form of the HOUSE. Let it be said that the HOUSE series is more difficult than the beginning TENT

series. However, this hierarchy of difficulty does not proceed from item to item; rather it exists only between the two levels of the TENT and HOUSE series.

To begin administering the CEFT the examiner first trains the subject as to the procedure required to complete the test. This is the purpose of both the discrimination and demonstration series. By the time a subject enters the practice phase of the test the examination is about to begin, and the examiner must determine whether the individual understands the task and is ready to proceed. The dichotomy between training and practice is important because of the general instructions for the test which stress that verbatim instructions are not as important as obtaining a reliable measure of an individual's performance on the test.

The test training procedure begins with the cut-out shapes of the TENT and the HOUSE, the discrimination plates, the subject, and the examiner. The examiner initiates the training by asking the subject to find another TENT on the page that looks exactly like the cut-out TENT. If the subject is uncomfortable with the term TENT the examiner may wish to ask the subject for his/her own label of the figure. This strategy was suggested as a means of encouraging the child to view the picture of the complex design as a whole. The strategy not only involves the subject immediately but also shows some initial perceptions and reactions of the subject to the exercise. The researcher found that most

children preferred to call the TENT simply a triangle whereas the HOUSE elicited a variety of perceptions.

During the training procedure the child shows his/her response by placing the shape of the TENT over the shape of the triangle that is correct in size, shape, and orientation. However, when the brief practice session begins the examiner hides the cut-outs from the view of the subject. Upon identifying the shape of the cut-out the subject traces the shape that he/she perceives from his/her mental image of the cut-out with his/her finger. Included with the test materials is a rubber stamp that might be used with younger children; however, this researcher found that outlining the shape with the index finger was a superior means of indicating where the shape is hidden in the design. This way a specific rather than a general area could be determined as the response, hence making it easier for the examiner to score the subject. In the event the subject forgets the shape for which he/she is looking, the examiner may uncover the cut-out between plates for the benefit of the subject. There is no penalty for viewing the cut-out between cards; however, any help rendered a frustrated subject should be scored as an incorrect response.

Likewise, instructions for terminating a test are also given. For instance, if a subject fails two discrimination cards in a row after three trials in succession, then testing should be terminated. Testing is also terminated after all items in the TENT series have been failed. In the case of the HOUSE series, the test is terminated if a

subject fails five items in a row. Once the test begins it is only interrupted by the change in cut-out. The examiner merely retrains the subject with the house shape discrimination series and the one practice card. The HOUSE series part of the test continues from there and is discontinued only if the subject misses too many items or becomes completely frustrated.

With these procedures outlined in the Manual (Witkin et al., 1971) the examiner can become familiar with the administration and scoring of the CEFT. Since there is a total of 25 items the maximum score is also 25, the subject's total score equaling the total number of correct responses passed. There is no time limit imposed on the search for the embedded figures. The judgment of the examiner is nevertheless important in determining whether the subject is taking his/her time because he/she is highly motivated or frustrated by the task.

The general instructions for the CEFT further point out the crosscultural versatility of the CEFT. Specific verbatim instructions are not required. Instead, the examiner trains the subject in a procedure. The subject then demonstrates his/her comprehension of the task with psychomotor responses rather than verbal ones. Therefore, the CEFT can be easily used with bilingual children as long as the examiner is proficient in the target language and culture.

Perceptual Acuity Test (PAT)

The Perceptual Acuity Test (PAT) authored by Harrison G. Gough (1980) is described by Johnson (1976) as a multiple-choice test measuring the variables of field independence and analytic perceptual ability. The PAT is a uniquely conceived optical illusion test for measuring field independence. It consists of a series of thirty multiple-choice items presented by means of 35 mm slides. The items comprising the instrument introduce a geometric form such as a straight line or a cube. This referent shape is designated by the letter (a). Following this geometric form of comparison are four other choices, such as four straight lines of varying lengths or four cubes of various dimensions each represented by the choices of letters (b), (c), (d), (e). The subjects are to view each slide for approximately 20 seconds of projection time while marking their responses on a multiple-choice answer sheet indicating their judgments regarding the choice that matches the relative size, shape, area, length, etc., of the model line or cube projected. With the projection time being controlled by the examiner the entire test can be conducted in little more than 15 minutes. The PAT offers the advantage of administrative versatility since testing can be done in groups or individually. The most important factors to be considered are the testing conditions. Ideally the room selected for projection and administration of the PAT should be free from noise and interference so that the examinees can devote their full attention to this time

controlled test. Further versatility of the PAT includes a broad age range from eight years old on up. Finally, the description of the PAT distinguishes 25 optical illusion problems and 5 illusion free items for a total of 30.

No manual for the PAT exists. Instead, an instruction sheet of general directions and information is included in the package directly from the author. Instructions include taking the set of 30 posters and making transparency slides from them to project for group audiences. To be sure, the posters are adequate for individual administration; however, this researcher intended to use this as a group instrument and proceeded to make the necessary positives.

The instructions suggest that the examiner make slides, seat subjects properly, pass out answer sheets, and read the directions aloud to the group while the examinees read them silently. Verbatim instructions have the same purpose as those of CEFT: to instruct the subject how to perform the task. In addition, the PAT introduces a time constraint to the perceptual task. After the examinees have had enough time to fill out the information blanks on the answer sheet form, the examiner projects the first slide. It is allowed to be illuminated for more than the usual amount of time so that the examinees can have sufficient time to orient themselves to the task. The examiner explains that he/she is leaving the first slide on an extra amount of time so that everyone will understand the nature of the test. However, the rest of the slides will be timed with a stop watch, and the number of each slide will be called out to alert

subjects to a changing transparency as well as to orient them to the timed sequence for rapid response and quick decision making. Once begun, the PAT goes very fast.

In addition to being a rapidly paced test that can generate a great deal of data in a relatively short amount of time and space, the PAT offers the same cross-cultural characteristics as the CEFT, namely, the subjects learn a procedure or process to which they respond non-verbally. It is the function of the test administrator, therefore, to use whatever language necessary to make known to the subject the nature of the task so as to be able to elicit responses based on visual perceptions.

The cross-cultural nature of the task is underscored by its author. Gough and McGurk (1967) suggest reading aloud the instructions on the bottom of each slide in order to reduce problems of reading comprehension while emphasizing the non-verbal nature of the task. Verbal instructions are merely to explain the task and can be switched to accompany the language or culture being researched. The utilization of the PAT cross-culturally includes Gough and Hug (1968) between French and American children; Gough and Delcourt (1969) between Swiss and American children; Gough and Meschieri (1971) between Italian and American children; and Chandra (1972) between Indian and Fijian high school and college subjects. To facilitate cross-cultural administration of the PAT with younger children, Gough and Hug (1968) originally suggested simplifying instructions, the object of the test being non-verbal.

Just as language and culture were not meant to be constraints upon the PAT, neither was time. Gough and McGurk (1976) originally designed the PAT with thirty second intervals between each stimulus. Later it was reduced to twenty seconds, according to the instructions received from Gough (1980). However, to generalize the instructions for the PAT for the specific research situation at Seville and Pierson schools, the time for each slide was increased to thirty seconds apiece while the researcher read the instructions aloud on each slide after calling out their number in sequence. It takes approximately ten seconds to read each direction out loud, leaving a remainder of twenty seconds per slide to look at the problem and mark a response. Two factors led the researcher to administer the PAT in this fashion: first, the distracting nature of the vocabulary used to depict the problems of geometric forms and illusions and, second, the characterization of the children from these two lower socioeconomic level rural schools as generally poor in reading ability. These methodological adjustments facilitated the administration of the PAT in the cross-cultural setting of bilingual schools.

Even though there are thirty problems encountered on the thirty slides, the scoring procedure has two variations. Gough and McGurk (1967) discuss the history of the scoring procedure as part of the development of the instrument. The unweighted versus the simplified weighted scoring system has to do with the test being constructed of optical versus non-optical illusions. One possibility is to score the test

items as correct or incorrect with possible illusion scores ranging from zero to 25, and possible non-illusion scores ranging from zero to five. However, Gough (1980) and Gough and McGurk (1967) recommend using the simplified weighting scores of two, one, and zero to give extra credit on some of the choices for the optical illusion items. Although there is still only one correct option for each test item, the subjects have a better chance of improving their score on problems that require fine visual discriminations or that project similar alternatives as the solution. The weighted scoring system increases the total possible scoring range from zero to 55 whereas the original unweighted scoring system results in a scoring range from zero to 30. Following the recommendation of the author, this researcher chose to use the weighted scoring system as a methodological consideration. According to Gough (1980) this total weighted score best measures the implied ability assessed by the PAT.

In addition to noting the historical development of perception problems involving geometric form and optical illusions, Gough and McGurk (1967) established the first data in the literature dealing with standardization and norms for the PAT. Acknowledging the need for additional research, Gough and McGurk report test-retest reliability data at +.70 for a sample of one hundred grade school subjects as of only moderate internal consistency. From the beginning Gough and McGurk anticipate comparisons between the PAT and Witkin's Rod-and-Frame or any other instrument

measuring field independent cognitive styles, since the authors foresee future research. It was not until 1972, however, that Gough and Olton conducted an investigation to relate field independence to other measures of nonverbal perceptions and abilities.

Correlations between the PAT and the Rod-and-Frame Test produced a coefficient of -.41 which Gough and Oltan (1972) regarded as significant. These writers were thus convinced that the PAT was an acceptable instrument to use in cross-cultural cognitive style studies. Since the EFT and the CEFT were never compared with the PAT, but only to the Rod-and-Frame Test, it was left to future research such as this investigation to attempt other correlations.

To conclude the methodological procedures and information about the PAT it should be stated that the instrument does lend itself to cross-cultural ease in administration. Instructions are intentionally general to get across the notion that a procedure is being learned to generate a nonverbal response of perception. Nevertheless, the PAT still lacks much normative data. The researches of Gough and Hug (1968), Gough and Delcourt (1969), and Gough and Meshieri (1971) point out that cross-cultural studies between French, Swiss, Italians and Americans indicate developmental trends in field independence as measured by the PAT; however, significant differences in the field independent cognitive style were not established cross-culturally with the PAT. The need for further research with the PAT is being fulfilled in part by including it in this

cross-cultural investigation utilizing a multi-method approach.

Child Rating Form Field Independent Observable Behaviors/ Child Rating Form Field Sensitive Observable Behaviors (CRFFIOB/CRFFSOB)

Ramirez and Castaneda (1974) included in the appendices of Cultural Democracy, Bicognitive Development, and Education the two instruments entitled Child Rating Form Field Sensitive Observable Behaviors and Child Rating Form Field Independent Observable Behaviors (CRFFSOB and CRFFIOB). This is to say that although these two are really separate instruments, they were meant to be used together.

Instructions included for the use of these two instruments are very brief. It is pointed out that the CRFFSOB and CRFFIOB can be used as either an instrument for determining the global or a situation specific cognitive style. Global cognitive style refers to the child's overall or preferred cognitive style. This researcher employed these instruments for determining an individual's preferred or global cognitive style whereas they may also be used to investigate a specific situation, such as a math lesson, to observe a child who, for example, has shown a preference for the field sensitive cognitive style but demonstrates observable field independent behaviors in another context.

The instruments are structured such that eleven different behaviors are classified under four different categories. Both rating scales can be assigned a frequency from five (almost never) to one (never) if the researcher intends these instruments to reflect bicognitive behavior.

Global cognitive style functioning, however, is determined by observing the child over a period of several days in a variety of situations. One set of characteristic observable behaviors which reflects the dominant cognitive style preference is identified as the child's global cognitive style by the observer. A child may display behaviors from either set. It then becomes the observer's task to determine how many more of the behaviors are preferred as well as representative before determining the global cognitive style of a child. Obviously, observer perception and agreement are at stake. Observer agreement can be achieved, nevertheless, by all observers watching the same child during the same situation, and coming to a concensus on what specific behaviors are being observed.

Instructions for these child rating forms are necessarily brief and general. These are not research instruments but research products for cognitive style. The authors Ramirez and Castaneda (1974) give further examples of how these child rating forms can be used. Their purpose is to promote the concept of cultural democracy in addition to bicognitive development in education. Unfortunately for research purposes these instruments exist without any published empirical data (Ramirez, Personal Communication I, 1981). Therefore, it is unique to this study to use these instruments in order to research their correlation with other measures of cognitive style.

The procedure used by this researcher to standardize the methodology for the CRFFSOB and CRRFIOB takes into

account the general instructions. Since these instruments are checklists of observable behaviors, the researcher considers them observational in nature, as opposed to the CEFT and the PAT, which are basically traditional kinds of psychological instruments.

To use the child rating forms, observation was required on the part of the researcher. Each class became a group that was already divided by the school system into age-grade classifications. The researcher took advantage of this structure provided by the schooling system to observe all of the children in a particular class. The teacher became a key figure in the collection of observational data. With the cooperation of the classroom teacher, the researcher visited all classrooms from third grade through sixth grade in both of the rural elementary bilingual schools under study. The researcher spent three days a week (usually Monday, Tuesday, and Wednesday) with each class, going through their daily routine. After all classes in both schools had been observed in this fashion the researcher began a second round of three day visits with each class to administer the individual CEFT and the group PAT, as well as to identify the cognitive style of each student with teacher consensus using the CRFFSOB and CRFFIOB.

The three day initial observation period served as more than just a means to collect data for one particular set of instruments. Indeed, the observations of the researcher in the rural school setting required the establishment of rapport with the groups being studied. The researcher was

able to learn the name of each child and observe all of them in all of their classes so that each subject tested for cognitive style was an individual. Furthermore, the researcher was able to explain the research being conducted and the construct being investigated to each teacher and group of children during this first phase of observations. The first phase of observations was begun in September of 1980 and was completed by December break.

In January the second round of observations and testing began and were finished in April of 1981. In the case of the CRFFSOB and CRFFIOB the data were finalized by the researcher sitting down with each individual teacher to go over the two checklists of behaviors and determine the dominant or preferred cognitive style for each of their students. This procedure assisted the researcher in two ways. First, the classroom teacher knew each child better than the researcher, although the researcher was more familiar with the construct being observed. Second, this method maintained a preferable state of objectivity, so that the consensus reached by the teacher and the researcher would be the least biased as possible. Fortunately, most students were easy to categorize as preferring one cognitive style or another. The few students who escaped ready classification by either the researcher or the teacher could easily be placed by the two of them going through the lists of behaviors, discussing examples of specific behaviors and insights into personality, and reaching a conclusion together as to the cognitive style globally observed as

dominant. This was the process employed by the researcher to identify cognitive style with the CRFFSOB and CRFFIOB instruments.

Recording a Data Profile

The methodology of the particular CRFFSOB and CRFFIOB instruments necessitates overlapping data collection of observable behavior checklists within the context of field method procedures. In the next chapter this overlap will be dealt with in more detail with the multi-methodology.

Data collection using a multi-method approach as well as a multi-method methodology produces in this study an individual data profile of each subject tested and observed which contains both quantitative (numerical scores) and qualitative (categorical classifications) data. A data profile is the result of an individually administered CEFT score, a group administered PAT score, and a cooperative categorization observed by the researcher and classroom teacher with the CRFFSOB and CRFFIOB instruments. These three different measures of cognitive style, which are repeated with different instrumentation, each define field independence in unique operational terms.

Operational Definitions of the Construct

In operational terms, the CEFT defines field independence by a score lying at the higher end of the zero to 25 range of possible scores. In operational terms, the PAT defines field independence by a simplified weighted score lying at the higher end of the zero through 55 range of possible scores. Operationally, for the CRFFSOB/CRFFIOB

instrument set field independence is defined as the classification for which more observable behaviors are rated. Likewise, field sensitivity (the Ramirez and Castaneda term for the opposite of field independence) is defined operationally by the CRFFSOB/CRFFIOB instrument set as the classification for which more observable behaviors are rated. In the same fashion, both the CEFT and PAT do not define field dependence operationally. Part of the problem seen earlier with both of these instruments in their construction is that they measure the extent to which an individual is field independent. The default operational definition of field dependence in such negative terms is part of the reason that Ramirez and Castaneda (1974) introduce the concept of field sensitivity in place of field dependence and approach measuring it observationally with a companion instrument of equal representation. Although field dependence measurement has always been an instrumentation problem for this incipient construct, cognitive style researchers, including Witkin, have had to define field dependence operationally as the degree to which an individual is not field independent.

Similar to the operational definition of the construct is the restatement of the hypotheses in terms of field independence:

1. There are no differences in field independent scores and classifications among Anglo, Black, and Mexican ethnic groups.

2. There are no differences in field independent scores and classifications between males and females.
3. There are no differences in field independent scores and classifications among grade levels for third through sixth grades.
4. There are no correlations among the field independent scores and classifications that measure cognitive style.

Likewise, explicit definitions regarding ethnic group follow:

1. The term Anglo, as it is employed in this research, refers to any white, English-speaking, North American Caucasion of European extraction who is a member of the dominant majority culture.
2. The term Black, as it is employed in this research, refers to any Negro of African or Negroid extraction who speaks English and/or a dialect of standard English and who is a member of an American minority cultural group.
3. The term Mexican, as it is employed in this research, refers to any Mexican American or Mexican migrant whose dominant or first language is Spanish, whose extraction is Mexican, and who belongs to a minority cultural group.

Let us conclude this section of definitions with a reiteration of the operational definition of a bilingual school. The term bilingual school, as it is employed in

this rural research, refers to a school in which members of a minority ethnic group whose first language is not English are clients.

Data Processing

To process the data gathered and to test the above hypotheses, the statistical procedure called analysis of variance (ANOVA) using a 3x2x4 factorial design was employed for CEFT and PAT. The ANOVA tested for significant statistical differences between ethnic groups, sexes, and grade levels (independent variables) for the outcome of interest (dependent variable), namely field independence. In addition, the Pearson Correlation determined whether the instruments correlated well enough to indeed be measuring the same dependent variable. Because of the problem of reliability, a reliability estimate for the CEFT was made using the coefficient alpha calculation and for the PAT it was made using the Kuder-Richardson procedure (KR-21). A chi-square procedure was performed on the CRFFSOB/CRFFIOB data because it is categorical. These statistical procedures were performed in addition to the multi-methodology in the next chapter. All data were scrutinized for interpretation using quantitative (statistical) procedures as well as qualitative (observational) methods.

Assumptions and Limitations

In addition to the usual statistical assumptions such as normal distribution of the data, etc., the researcher has already spelled out in the Selection of Subjects section of this chapter the gross considerations for generalizability.

These concerns include a normal distribution of ability in the classroom unit and the characterization of the schools as of lower socioeconomic status. The rural area chosen is geographically of interest, for little is known about the Mexican migrants who come to this region for work. In fact, little has been studied about any of the ethnic groups and schools in the sites selected, cognitive style or otherwise. Smith (1980) is the first investigator to have studied any of the Mexican migrant needs in the public schools of this rural area.

The limitations of this study become apparent with the close scrutiny of the instruments employed for cognitive style identification. Little normative data exists for CEFT and PAT; none exists for the CRFFSOB and CRFFIOB instrument set. The value of this research lies in the fact that it will establish more information about these instruments as well as the construct itself.

Summary

To summarize this chapter on methodology, let it suffice to say that Chapter IV describes the multi-methodology employed. Chapter V will continue by returning to a statistical evaluation and analysis of the findings. Chapter VI will conclude by recapitulating the conclusions and recommendations of the findings in terms of statistical and multi-methodological approaches.

CHAPTER IV
MULTI-METHODOLOGY

The purpose of this qualitative chapter is to give a more detailed account of the multi-methodological procedures employed in the observation and data collection phases of this investigation. Because this study utilized both traditional psychological instruments and observational checklists to measure cognitive style, it is in keeping with the perspective of this multi-method approach to interpret the data gathered using both quantitative (statistical) and qualitative (observational) analyses. Therefore, this multi-methodology is a means of achieving a meta-analysis that overviews the entire proceedings. The relevance of the multi-methodology to the quantitative aspects of this study is to provide a framework from which to interpret findings, since the results of the multi-method methodology vary from instrument to instrument.

The structure selected by the researcher that best related to the multi-methodology is based on Witkin's original conceptualization of the construct of cognitive style. Witkin et al. (1977a) established the link between field independent/field dependent cognitive styles and their implications for education while unifying the diverse elements from which cognitive style was defined. Three major areas subsumed under cognitive style theory include

perception of the upright, psychological differentiation, and figure embeddedness. These three areas in turn provide the background from which the dimension of field independence/field dependence is defined.

Perception of the upright in space refers to the sense of gravity or up as determined by internal stimuli or external referents. Psychological differentiation deals with the perception of self as either separate from or as part of the organized field. Figure embeddedness involves the ability of the individual to perceive a particular figure within the context of an embedding field, while field articulation has to do with the perception or organization of a field in global or analytic fashion. These three elements of cognitive style all relate to the dimension of field independence/field dependence through the concept of field. Therefore, the concept of field is the principal factor around which revolves the dimension of field independence/field dependence in this multi-methodology. This multi-methodology will assist the conceptualization of the term field as well as provide a means of tying together the diverse instrumentation in this multi-method approach.

Observation of the Bilingual Schools

Initially this researcher set about to observe all of the children in grades three through six that were to be measured for cognitive style. This method not only served as a means of establishing rapport between the researcher

and the students, teachers, staff, and principals of the two rural schools involved, but also provided the researcher with an observation period to identify the cognitive styles of students using the CRFFIOB and CRFFSOB instrument set. Each week, beginning in September of 1980, the researcher would visit a classroom for a three day period and follow the group from one special class or activity to another. Spiraling from the sixth grade down to the third the researcher would finish one school before going to the next in order to learn the names of all students and to see each student in a variety of learning situations for a global view of his/her cognitive style. Observation of both schools was completed by the December break for the holidays. This review of the basic methodological procedure for the observation period is meant to serve as an orientation for the multi-method analysis that follows.

Seville is located in a narrow northwest corner of Volusia County, Florida, that extends upward to Palatka in Putnam County. In fact, Palatka sometimes serves as a reference point for the location of Seville, which is just over the border in Volusia County. But Seville is still tied to Volusia County and especially to Pierson which is just five miles down highway 17 to the south. Pierson is heralded as the fern capital of the world, and Seville is often perceived as an extension of Pierson in that fern industry. Indeed, Pierson is the larger of the two small towns, with a few stores and businesses at its crossroads in addition to schools and churches in the community. Seville,

on the other hand, is so small that, were it not for the school by the curve in the highway, it would hardly be noticed.

One of the oldest physical plants in the state school system, Seville Public School is an antiquated wooden structure under grand old oak trees lined by a few portable classroom units on its left back flank. The school is so old, in fact, that the former principal was proud to show guests the old hand-rung school bell that was still in service as a bell system. The history of this school further establishes its ties to the neighboring brick and stucco plant that is Pierson Elementary School. In the days of school segregation, Seville school housed the Black student population for the surrounding community. Following desegregation Seville was turned into an elementary school, despite its delapidated appearance and need for renovation. With the advent of migratory labor in the fern industry, Seville Public School came to house the first local bilingual program for the entire community. That is to say, all Mexican migrant students who were not mainstreamed or proficient enough in English were bussed to Seville from Pierson and other surrounding schools in the northwest region of Volusia County. In the future Pierson may become the school chosen as a bilingual center for the area, if the number of migratory students in the locale continues to

increase. Historically , the relationship between Seville and Pierson schools has remained consistent and enduring over the years.

Cognitive Style Identification with CRFFIOB/CRFFSOB

The CRFFIOB/CRFFSOB instrument set categorizes field independent and field sensitive observable behaviors under four major headings: 1) relationship to peers, 2) personal relationship to teacher, 3) instructional relationship to teacher, 4) characteristics of curriculum which facilitate learning (Ramirez and Castaneda, 1974). This is the introduction to the set of instruments that the researcher initiated with the individual classroom teacher. The introduction led into the body of specific characteristics and behaviors that were designed to identify the two different styles of learning. The researcher used the differentiation of field independence and field sensitivity into relative polar opposites to teach and explain to the teachers the two conceptualized learning styles portrayed by the observation checklists. For example, the first behavior set identified under the heading Relationship to Peers contrasts "Likes to work with others to achieve a common goal" with "Prefers to work independently." The former relationship is field sensitive and the latter is field independent. The point of this first group category of behaviors is to contrast small group versus individual task orientation. Other behavior subsets contrasted in the first

category include cooperative versus competitive behavior subsets and social sensitivity versus work orientation in general.

By contrasting the eleven pairs of behavior subsets included under the four principal behavior headings, the researcher was able to form a mental image of the two distinct learning modes in the minds of the classroom teachers with whom the researcher was working. This procedure accomplished two goals: not only did it acquaint and familiarize the teachers with the instrument set that the researcher was investigating, but it served as a medium of introduction and instruction to the concept of cognitive style for the teachers. It must be pointed out here that few teachers with whom the researcher worked had any notion of the concept of cognitive style, let alone the dimension of field independence/field dependence being studied. The few teachers who had heard of the construct mentioned sensory modality preference and cognitive style mapping as the terms they were acquainted with which related to the dimension being researched. That is to say, it soon became very apparent to the researcher that it would be necessary to train each of the classroom teachers in the concepts, construct, and instrument set with which they would be rating their own students.

Of course the researcher was there to assist and instruct the teachers in the entire process devised to gather data using the CRFFIOB/CRFFSOB instrument set. The point merely illustrates the many roles assumed by the

researcher in the course of data collection. This duality of roles, teacher-trainer combined with researcher, illuminated the usefulness of the CRFFIOB/CRFFSOB instrument set for teacher training purposes in cross-cultural cognitive style even if it has not shown to be always successful for research purposes. Furthermore, the design of the CRFFIOB/CRFFSOB instrument set lends itself to further development with other characteristic behaviors, if the particular ones enumerated were not fruitful. It was not until the second phase of data collection, however, that the researcher actually sat down with each individual teacher at some convenient time to label and identify every student in the class according to their preferred cognitive style. The researcher appreciated the cooperation shown by all teachers in the course of the entire data collection procedure. The cooperativeness of the teachers and school staffs in general assisted the researcher in formalizing observations about how the cognitive style construct functioned in the classroom and operated within the context of the school structure.

Cognitive Style Identification with PAT

Whereas the CRFFIOB/CRFFSOB instrument set is a checklist of observable behaviors, the Perceptual Acuity Test (PAT) is a group instrument that can also be individually administered. The administration of the PAT to individual classrooms took place during the second phase of

data collection. Usually the researcher was reintroduced to the classroom groups with the administration of the PAT.

The children in each classroom group were told that the researcher would return the following term for final observations and testing. By way of introduction, the researcher explained to the various classroom groups that she was there as a graduate student from the University of Florida to do a study about how boys and girls learned, to see if there was any difference in learning style among the various children in the different grade levels. The researcher went on to tell the students that, in addition to the classroom observation she was doing, she would administer the Perceptual Acuity Test, which was a group activity that would give the researcher more information about individual differences in learning style. Furthermore, the children were told that after the group activity was finished, the researcher would sit down individually with each student to play a little game or puzzle that would also give the researcher more information about how an individual learned. This process usually required another three day visit with each classroom to administer the group PAT and the individual CEFT as well as to consult with the teacher on the CRFFIOB/CRFFSOB ratings. The second phase was begun in January, 1981, at Seville and was completed at Pierson by late April.

While the checklists of observable behaviors required the researcher to do teacher training in order to implement this instrument set with the teachers for data collection,

the PAT required the researcher to be patient in order to administer it. The acceptance of the bilingual researcher by the school officials into the public school system of the county to do research required that the researcher avoid disrupting the regular classroom activities as much as possible. These constraints were normal and understandable, given the responsibility of the classroom teacher to instruct. However, the researcher was not prepared for the conditions under which she would attempt to measure cognitive style via the PAT. The two rural schools have already been described as lower socioeconomic in status, with Seville being the oldest and smallest of the two in regard to physical plants. Both lacked available space to do consistent group testing. It was therefore necessary for the researcher to conduct the administration of the PAT in each individual classroom, instead of administering it in, for example, the auditorium or a spare library room. Space was a premium in these two over-crowded school facilities. The auditorium at Seville housed the school library, and the lunch room at Pierson frequently housed classes, classrooms, and offices. It was a constant problem for both principals to try to find enough physical space to contain the ever increasing enrollment and staff.

Scheduling was another obstacle to testing. In addition to the problem of trying to find a quiet and adequate room for testing, even if one had been available, only one classroom at a time could have been tested due to the conflicts in scheduling. By the time the art, music,

physical education, guidance, special education, migrant, and bilingual teachers could schedule all of their special classes, it was difficult to get several classrooms together for anything without making huge adjustments in everyone's schedule. The impact of the problems of space and time on data collection are especially seen in the results of the PAT measurement. The PAT scores and the analysis of this data to be presented in the following chapter must be interpreted in light of this multi-methodology.

To describe the conditions under which the PAT was administered is to say that the circumstances were variable, depending on the size of the class and the room into which it was fitted. A review of the general instructions for administration of the PAT includes the suggestion to have enough space for seating and quiet for concentration. When the researcher arranged with the individual classroom teacher a convenient half hour to set up the screen and projector and administer the twenty minute group activity, it was not known the extent to which these conditions would vary from week to week and class to class. Since these conditions were unpredictable, the researcher had little choice but to take advantage of the testing opportunity that each teacher provided and that space afforded.

Thus, although administration of the PAT was consistent, factors outside of the control of the researcher or even the classroom teacher contributed to the distortion of the PAT scores. In the case of Seville, the size of most

classrooms was so small that students were bunched together around tables or desks in order to see the screen. Consequently, the test was not taken seriously. Being an unusual type of instrument that relies on visual perception, the slides for the PAT encouraged group efforts even in marking the score sheets! Student talking and cooperation in responding to the test questions could not be controlled by the researcher, who was operating a slide projector and stop watch at the same time. Furthermore, many students were frustrated by the similarity of the lengths and shapes of the geometric forms presented as optical illusions, and they verbally expressed their feelings during the timed sequence of the visual stimuli. All the researcher could do was encourage positive behaviors and continue with the presentation as planned.

Reading the instructions aloud as they were written on each slide was a strategy used by the researcher to facilitate the administration of the PAT. Not only the vocabulary selected, but also the particular wording of the directions contributed to examinee frustration. Therefore, by reading students the obscurely written directions printed on each slide, the researcher was able to direct student attention to the task at hand and boost test morale. Once again, the problem was not lack of student cooperation, for they responded positively to the novel testing activity. Instead, the problem was more a lack of seriousness that resulted from uncontrollable physical circumstances as well as poor instrument design. Not all of the rooms were

overcrowded, but student reaction to the testing instrument was usually the same. Students regarded the test taking as fun because it was different, but they disliked being unable to respond to the fine discriminations that their eyes were required to make, and they said as much. However, there were always enough students who were coordinating measures of length and size with their fingers and eyes that, by the end of the test, most subjects anticipated the individual puzzle (CEFT) to be taken next. In conclusion, it must be said that student reaction to the PAT was not unusual in that teachers and other adults viewing the PAT for the first time responded similarly to the visual difficulty of this optical illusion test.

Cognitive Style Identification with CEFT

The CEFT is the most established cognitive style instrument of the three employed herein to measure field independence/field dependence. It is a traditional psychological instrument used in research and developed by Witkin and his associates (1971). The CEFT, although different than the Embedded Figures Test, was originally developed as a children's version and was normed on it. The CEFT, however, was developed as an alternative instrument to measure cognitive style by a different means than Rod-and Frame and Body Adjustment Tests. The relationship of the CEFT to the Rod-and-Frame Test is not known. Included among criticisms of cognitive style research are questions of construct validity, the affects of situational variables, and the distinctiveness of the field independent/field

dependent dimension (Rosenburg, Mintz, and Clark, 1977). This multi-methodology is also meant to put these research criticisms regarding cognitive style within the qualitative perspective of this study. In suggesting that the CEFT be used only for research purposes, Witkin et al. (1971) are aware of issues of construct validity regarding this particular instrument. Furthermore, the distinctiveness of the field independent/field dependent dimension has to do with sensory classification. Christman (1979) says that there is probably no such thing as a sense of gravity or a sense of up, although this "sense" does influence behavior, particularly at a level below conscious experience. Its distinctiveness, therefore, depends on how it is mediated and classified in relation to other sensory experience. Witkin et al. (1977a) define this sense of up as the perception of the upright in space, all the while recognizing that the inner ear, internal organs, and sight affect this perception. No claim was ever made that one sensory organ alone is involved in this illusive sense of gravity. The reliance on many different internal sensations does, however, lead to the two distinctive methods of embedded figures and rod-and-frame to measure the dimension.

In describing in ethnographic terms the data collection using the CEFT, the effects of the situational variables were far more important than the other criticisms leveled at the whole construct. The situational variables, such as attitude, motivation, time, etc., affected the outcome of the individual scores in a global fashion. Let it be said

that in general the children responded positively to the individual administration of the CEFT by the researcher. The details for actual administration of the CEFT were enumerated in the preceding methodological chapter. Here the discussion will turn to a description of the testing situation employing the CEFT.

In the context of data collection the administration of the CEFT was a highlight for both the children and the researcher. The CRFFIOB/CRFFSOB instrument set provided an opportunity to get to know teachers individually while serving as a pretext to observe children. The PAT, on the other hand, afforded a unique group experience for both the teachers and the students while the researcher witnessed group cognitive style behaviors. By way of contrast the CEFT set up a different circumstance by which the children were able to interact with the researcher on an individual basis without the mediating constraint of either the teacher or the group. Both the students and the researcher enjoyed this one-on-one interaction.

The normal routine with each class was to reintroduce the researcher in the second phase of data collection by means of the group administration of the PAT followed by the individual administration of the CEFT. To work with students on an individual basis without disrupting the regular classroom to any large extent, the researcher would set up her materials in some convenient corner or place designated by the teacher. Because the children were eager for their turn at the CEFT, the researcher would usually

call students one by one from the nearest row of seats or tables. This procedure eliminated the curiosity of those students within auditory proximity who would otherwise have been distracted by the novelty of the game or puzzle, as it was called. More importantly, those students within auditory or visual range would be fairly assessed, not having learned the location of the embedded figures by observing their fellow classmates. Despite this orderly implementation of the test administration routine, some students could not resist a special request that their turn be next. Occasionally such a request would be honored by the researcher, if a particular student was soon to be excused for a special appointment or activity. This flexibility pleased the students in these instances. The nature of the CEFT provided a fun activity for the students and relief from the dull monotony of the daily classroom routine, so much so that some students even requested that they would like to have a second turn at taking the CEFT. Older students made this request under the pretext of improving their scores, while younger students were merely intrigued or wanted another turn because they were bored with seatwork.

Indeed, most of the CEFT testing was done while students were engaged in seatwork, the most common classroom practice at both schools at all grade levels. This observation is not meant to undermine the intrinsic appeal of the CEFT that motivated the students to try their best on the puzzle. Students were keenly aware that the researcher

was keeping score and were constantly asking the researcher how many they got right. Since there is no time constraint on the CEFT, particularly highly motivated and competitive students would take their time until the researcher would encourage them to go on to the next item. These were usually the older students, who were more socialized into schooling procedures and values. Young students were able to take advantage of the CEFT as more of a game than a test. To be sure, students were informed that both the CEFT and the PAT were indicators of different learning styles, not of how well an individual learned. However, the researcher was not convinced that the students believed this interpretation, since boys and girls persisted in asking if they had done well or how many they got right. Refusing to give numerical scores as a response, the researcher tried to convey to the children that it was not the number of right answers that was important, but rather the fact that individual boys and girls learn in different ways. This answer was not meant to be evasive. On the contrary, the concept of different learning styles was a novel idea without impact, except for the strange devices and instruments of the researcher, on the lives of these rural children.

Individuality in interpreting the directions of the administrator for the CEFT by the children was observed by the researcher. Children were asked to recognize the shape of the Tent or the House as the embedded figure to be found in the complex design. Since the shape is more important as

a cue than what it is called, each shape was allowed to be given a name by each child. He or she could accept the label of the researcher or give it a new name if desired. Most children, when asked what they preferred to call the Tent, named it simply a triangle. On the other hand, the House being a more intricate shape to disembed from each novel field elicited a number of labels that included house, school, building, church, fence, etc. Each child's perception of the shape itself was an interesting psychological phenomenon that the researcher did not immediately perceive when beginning testing at Seville. By the time she reached Pierson, however, she had already begun recording individual interpretation of the House shape.

Furthermore, the researcher, while administering the CEFT, also observed that, although there existed two levels of difficulty in this particular cognitive style instrument, as a general rule, single items within each hierarchy were easier to identify than others. In the Tent series the Sled picture was especially disorienting, causing children to frequently question the orientation of the triangle for which they were looking. In the House series the rule of thumb was that every fifth picture might be a little bit easier than the preceding ones. This observation kept most children in the game of trying to find the embedded form. Just as they would become weary of the increasing difficulty of the House series, an easy figure would come along. This event kept the more field dependent children motivated at a critical moment when the test could have easily been

terminated for them, and it maintained the keen interest of the more field independent children when the puzzle was beginning to tax their motivation.

The researcher doubts that this occurrence was the result of an intentional design by the CEFT test developers. It just worked out that some items were generally easier to perceive than others for this population being identified for cognitive style. But it must also be pointed out that it has not been a practice in cognitive style research to spell out the multi-methodology, so that item variation in perception and difficulty has never been recorded in any literature known to this researcher. Until now the focus of cognitive style research has been on the statistical results in interpreting test scores and not on the methodology.

Rod-and-Frames

In attempting to bridge the gap between anthropology and psychology, Paredes and Hepburn (1976) relate culture to cognitive style. To be sure, culture specific and situation specific behaviors may still be a paradox in terms of universal generalizability of the cognitive style construct. It is in this fashion, however, that the following observations are made to relate a specific circumstance of schooling behaviors to cognitive style through features of the field independent/field dependent dimension. The first of these to be considered is the original notion of the sense of up or gravity, or the perception of the upright in space, as originally conceived of by Witkin and his

associates as they attempted to measure it by Witkin's body adjustment and rod-and-frame apparati. These theoretical observations will be continued herein as their relationship to the other features of psychological differentiation and embedded figures are discussed.

The laboratory instrument with the broadest application to educational research for identifying cognitive style is the Rod-and-Frame Test, which Oltman redesigned to make portable (1968). Whether stationary or portable, this instrument was devised to test an individual's sense of the upright through his/her perceptions selected from external (field dependent) or internal (field independent) stimuli. The luminous rod and/or frame tilted by the examiner was to be readjusted by the examinee in a position that was deemed upright by his/her gravitational sensations. The degree or extent to which a particular individual relied on internal criteria was measured by the instrument. Relying on external stimuli was theorized by Witkin (1979) to be the result of child rearing and socialization practices. Verification of these cultural influences was demonstrated in the classic research of Berry (1966), Dershowitz (1971), and others. The work of Ramirez and Castaneda (1974) was to show the effects of these cultural and social influences on the specific case of the Mexican American acculturating into the Anglo environment.

Within the microcosmic context of Seville and Pierson Elementary Schools, the rod-and-frame concept carries another interpretation. Due to lack of ready availability,

the rod-and-frame apparatus was not employed to identify cognitive style for this rural population. Nevertheless, it is a useful conceptual notion. The researcher theorizes that individuals, regardless of psychological instruments utilized for such purposes, seek the sense of up in every environmental setting. Cues may still be perceived internally or externally, depending on an individual's preference for a particular cognitive style that results from his/her upbringing and particular cultural experience. Indeed, the very work "upbringing" in the English lexicon attributes to this gravitational sensation a special orientation in the process of socialization. One who is reared correctly takes a sense of direction from being brought up in the mores and ethos of the transmitted cultural values, which in turn will direct the next generation. To rear up children is to bring them up right according to the rules of each culture.

In the culture of the school there exists a sense of uprightness as well. It is determined in general by the institutional schooling structure and in particular by each classroom teacher, much like a single parent or parents determine what is up in the home, with the society at large determining the broader cultural values. By following the analogy of the rod-and-frame, it can be theorized that the classroom is the frame in which all school children find themselves each day, with the individual classroom teacher taking the place of the rod. By the same token, the principal, being the next visible authority to the child in

the schooling hierarchy (and to the teacher as well, for that matter), may be analogous to the other parent. At times both authorities, the teacher and the principal, discipline children and require them to "straighten up." Again, the English language carries the idea of literal, physical orientation in reference to behaviors that require discipline.

If this theory is valid, namely, that the classroom serves as the frame and the teacher as the rod, then children adjust themselves in an upright fashion according to their individual home and cultural experience that they bring with them into the institutional milieu. However, some children may not be able to "right" themselves into an acceptable position due to incongruencies between the cognitive style of the teacher, principal, school, classroom, dominant culture, dominant language, etc., and the cognitive style of the individual. Cohen (1969) enumerates some of these incongruencies in terms of the school, which she describes as field independent or analytic, as valuing the student "to learn to sit increasingly longer periods of time, to concentrate alone on impersonal learning stimuli, and to observe and value organized time-allotment schedules" (p. 830). The school structure, which may achieve these valued goals through the individual classroom teacher or principal, does not necessarily convince the child in terms of learning, achievement, conduct, or future behavior. Cohen goes on to make her point more emphatic by observing how individuals

shift from formal primary groups to shared-function primary groups by changing their modes of group participation, language styles, and cognitive styles. The school structure may reinforce such deviant behavior through the aggravation of incongruent cognitive styles and disciplinary actions that reflect the power and authority of the institution. The shift in primary group by deviant individuals is observed in the change of the rod from the teacher to the peer within the classroom frame. This shift in frame or field (in field articulation terms) may be theorized as an in-field and an out-field operating within the context of the classroom frame. As the social deviants shift from rod to rod (teacher to teacher) each scholastic year, they finally arrive within the social rod and frame of the law, and then become the "outlaws." Rhodes and Tracy (1977) study deviancy in child variance through six different factors, including perception: genetic, developmental, arousal, perceptual, neurological, biochemical.

The process of adapting to the rod that is the individual teacher made it difficult for the researcher to identify with certainty the cognitive style of the individual with the CRFFIOB/CRFFSOB instrument set. At times is was difficult to ascertain whether or not an individual preferred seatwork to a cooperative group effort when the seatwork task was the prevailing mode of instruction provided by the school structure and enforced by the classroom teacher. Furthermore, the classroom teachers were subject to the same type of institutional structural

incongruency. The researcher observed incongruency in teaching styles almost universally, as determined by negative feedback, vocal register, and lack of opportunity to smile and be happy in the context of the classroom frame. Teachers themselves struggled to control and discipline the children and enforce rules and regulations which were either self-imposed or were the result of school policy to implement learning. Indeed, both teachers and students alike endured and tolerated the classroom frame's tedium and boredom, which was broken only by the student brave enough to be deviant or the teacher wise enough to resolve the conflict of incongruency by sharing power with the group.

Psychological Differentiation

The terms used to describe the field independent/field dependent dimension of the construct of cognitive style sometimes require explanation in themselves. The term psychological differentiation is an example of a term whose relationship to cognitive style is in some need of explanation. Witkin devotes one of his earliest volumes to the concept of psychological differentiation (Witkin et al., 1962) which he relates to education in his 1977 monograph (Witkin et al., 1977a). Determining the relationship of this term to the classroom and schools being studied herein for cognitive style identification is the goal of this section.

Basically, psychological differentiation refers to the capacity to distinguish oneself from the surrounding environment. As such, its relationship to the concept of

locus of control, which is often researched with field independence/field dependence, becomes apparent. Witkin et al. (1977a) bridge the description of field independence/field dependence with the terms articulated/global dimension and personality domains by stating that psychological differentiation is nothing more than a developmental framework for viewing the construct. The developmental nature of cognitive style provides latitude for inter-individual variation and change in persons over time. That is to say, the older an individual becomes as he/she reaches adolescence, the more field independent he/she is likely to become. In other words, an individual becomes more psychologically differentiated with maturity.

The tendency to become more psychologically differentiated with maturity is accounted for within the theory of cognitive style. That cognitive styles are stable over time describes a basic characteristic (Witkin et al., 1977a). Mature cognitive styles are predictively stable but always relative to the referent point of comparison. Young children learn their preferred cognitive style as they develop. The possibility exists, however, of changing or altering an individual's particular cognitive style through the outside influences that impinge on his/her development. Nevertheless, the more that children develop this capacity to view themselves as separate from the environment, the more they will tend toward field independency. Thus, cognitive

style becomes stable over time as the result of developmental processes.

Faterson and Witkin (1970) further studied the articulation of body concept and found it to increase during the growth years while remaining relatively stable over that period of time. Psychological differentiation, as this articulation of body concept is called, was measured developmentally utilizing the Human Figures Drawing Test. Scores for this test were obtained by the dual tasks of first drawing a human figure and then drawing another figure of the opposite sex. Their longitudinal study was investigating the very question of stability over time for this developmental concept. The relationship of psychological differentiation to perception was also studied at the same time in their research by means of a battery of tests including the Rod-and-Frame, Embedded Figures, Room Adjustment, and Body-Adjustment Tests. The results of the tests for articulation of body concept and perception paralleled each other.

In terms of classroom functioning the concept of psychological differentiation is observed as a separate aspect of field independence/field dependence, because it underscores the social and personality domains of cognitive style; that is to say, it emphasizes the field dependent characteristics of cognitive style. As noted in the literature review, the field independent characteristic of cognitive style is more easily isolated by test instruments

which are characterized by measuring the extent to which an individual is field independent. For testing purposes field independent scoring works well enough, but a better understanding of individuals who are not so field independent requires observation in order to view the interaction of the schooling milieu on the field dependent cognitive style.

Children are in general socially oriented by nature; their analytic skills are in the process of being developed. If the analysis in the previous section concerning rods and frames holds true, then it can also be said that children, while attending to the rod that is their teacher in the classroom, are relatively more field dependent than their teachers, who have had a chance to mature and stabilize their preferred cognitive style. Due to the compulsory nature of public schooling and the sanctions taken against social deviates, it behooves school children to pay strict attention to social cues and teacher facial expressions to survive and avoid punishments. Whether children take advantage of the schooling opportunity and adhere to the directions of their teachers or defy them, they are adjusting to the constant shifts in teacher authority. These same body adjustments require internal psychological adjustments that constitute the degree of psychological differentiation. Few of the children at Seville and Pierson were so sure of their own psychological identity that they could afford to be oblivious to the congruencies and incongruencies of teacher personality versus teaching style.

Even by sixth grade most children were heavily dependent on every movement, look, and tone of voice of their teacher. Furthermore, the sharpness of a teacher's vocal register and his/her need to establish complete authority and control before proceding with an activity were indicators of incongruencies within the teacher that reflected his/her own cognitive style identity. This general pattern of conflict that registered in the observations of the researcher could in part be explained by the psychological differentiation concept of cognitive style.

This articulation of body concept relates to another psychological theory in addition to cognitive style. Abraham Maslow (Kagan and Havemann, 1972) developed a theory of self-actualization in which the needs to be satisfied are hierarchical. The needs at the bottom of the pyramid are physiological in nature; those at the top require satisfying lower order needs to some degree before higher order needs are achievable. The ultimate need to self-actualize oneself is attune to the concept of differentiating oneself from the rest of the environment in a self-sufficient separate identity that includes being able to function independently and analytically from the surrounding field. Overcoming neuroses to achieve good mental health is a key to self-actualization; however, many persons succumb to deprivation and social pressures and never reach higher order needs. The purely theoretical position of this explanation for human behavior is attested to by the fact that it is difficult to validate empirically.

Nevertheless, poor articulation of one's physical self is indicative of incongruency in the satisfaction of lower order needs.

The Manual (Witkin et al., 1971) collects research findings that point out aspects of the field dependent personality as they relate to psychological differentiation and certain kinds of pathology. As the individual struggles to develop a sense of separate identity, unsuccessful differentiation may result in pathological disturbances. The fascinating research findings relating psychopathology to psychological differentiation insist on the prevalence of different kinds of pathology at both ends of the field independent/field dependent dimensional spectrum, that more differentiated cognitive functioning or field independence does not imply better mental hygiene or adjustment. Characteristic of inadequate field independent personalities are paranoia, delusions of grandeur, outward aggressivity, obsessive-compulsiveness, schzophrenia, etc. On the other hand, characteristic field dependent personality disorders include severe identity problems, obesity, alcoholism, asthma, psychosomatic illnesses, etc. The distinction between extreme pathological disfunctions in the two personality dimensions can be illustrated by the catatonic field dependent and the field independent ambulatory schizophrenic. However, field dependent pathological disturbances tend to be more generally observable, since the less differentiated individual exhibits more identity

disorders, psychological dependency, passivity and helplessness.

The observation in the school by the researcher of general problems of the less differentiated personality does in no way imply extreme pathological disturbances on the part of school children, teachers, principals and staff at Pierson and Seville. The point of these characteristics is to say that the general prevalence and visibility of dependent functioning, passivity, helplessness, obesity, somatic disorders on the part of students and teachers alike resulted in the general characterization of the population observed as field dependent.

Another way to point out this generalization is through the research compiled by Messick (1976). Witkin et al. (1977b) makes the same distinction as Messick when he characterizes vocational differences. The individual preference for liberal arts and humanities over technical sciences and mathematics also serves to distinguish field dependent personalities from field independent ones. Therefore, the relative comparison of individuals on their vocational choices and curriculum decisions can also serve as a basis for generalization of their cognitive style. That is to say, individuals who choose the field of education for study and the public school as their vocational career choice are relatively more field dependent in general. Furthermore, since females constitute the majority of public school teachers and since the documentation of female field dependency has already been

established as characteristic of the construct, it is relatively safe to further characterize the female teachers at Seville and Pierson as field dependent. The very few male teachers and staff at these schools could also be characterized as relatively field dependent by having chosen elementary school as their career instead of, say, engineering or college mathematics.

The point being established is that those observations of the researcher which resulted in the generalization of the students and teachers and staff alike as being relatively field dependent have as their basis empirical research in psychological differentiation. These characterizations or generalizations result from an overview that is similar to the forced choice decision by the individual classroom teacher and the researcher in establishing the preferred cognitive style of each child with the CRFFIOB/CRFFSOB instrument set. Indeed, Ramirez and Castaneda (1974) also include in their work a dual set of instruments for identifying teaching style. The researcher did not employ these instruments as part of the research design, but their existence was an additional factor in this qualitative interpretation. The meta-analysis that this chapter provides will be even more evident in light of the quantitative analysis in chapter five.

The generalization of the rural elementary schools of Seville and Pierson as being populated with field dependent staff, students and teachers is in no way meant to stereo-

type or negatively label the schools or individuals therein. The construct of cognitive style can be used to characterize an institution by observable qualitative data for educational purposes. The purpose for which the data are utilized determines whether a characterization is a useful generalization or a denigrating stereotype. Generalizing the cognitive style of the population being researched is an example of analytically articulating the field being studied with the very labels of the cognitive style construct.

One final argument for articulating the field of the school setting as being populated by less differentiated individuals on both sides of the desk of authority is found in the qualitative analysis of Gay (1978) and reported in Edward et al. (1981), namely that nearly all minority children in the United States are field dependent. Gay views the pluralistic classroom as a cultural microcosm. The cultural hypothesis for the field dependent cognitive style of ethnic minority group members relative to Anglo American groups has already been supported by Dershowitz (1971); Mebane and Johnson (1970); Ramirez, Castaneda, Herold (1974); and Witkin, Price-Williams, Bertini, Christiansen, Oltman, Ramirez, and Van Meel (1974). Witkin (1979), Madsen and Yi (1975), and Berry and Annis (1974) lend documentive support to the theory of the relative field dependence of rural ecologies as compared to urban settings. These findings, together with the observations of the researcher within the rural bilingual school setting composed of Mexican migrants, Blacks, and largely rural

and/or southern Anglos with traditional cultural values, support the generalization of the population as relatively field dependent.

Embedded Figures

The pattern observed by the researcher under this last section of qualitative analysis of the multi-methodology was the relatively incongruent field independent performance of the population of children tested for cognitive style. This exceptional performance in regard to the Children's Embedded Figures Test was the result of high motivation stimulated by the introduction into the classroom frame of a novel rod, namely the researcher. The performance of these children is considered by the researcher as incongruent because it was an example of situation-specific cognitive style. Whereas the researcher sought to observe the global cognitive style that characterized each child, actual performance on the CEFT was generally enhanced by high motivation.

That the researcher was perceived by the children, and even by the teachers, principal, and staff, as a unique rod was evidenced by the special treatment afforded her and by the suspension of normal rules and customs. The precedence of a researcher in the schools and classrooms was novel. Researchers infrequently had come to these schools to collect data, but the collection of observational data on a day-to-day basis within the routine of a regular school day was new. The hands-on access of the researcher to the children was a reciprocal pleasure that the children enjoyed. Likewise, the availability of the researcher to

the teachers in the lounge, or at lunch, or during planning periods gave reciprocal access of the researcher to the teachers, staff, and principals. In this fashion the researcher was able to process confidential information that led her to the generalization of a field dependent population. Health, psychological problems, personality adjustments, etc., that related to the entire population could be observed or discussed. The posture, physical appearance, health, weight, language, background, voice, schooling, values, etc., were daily noted by the researcher as this information came under her scrutiny. This subjective data was recorded and processed by the researcher to answer the question of whether cognitive style could be identified by observation. This characterization of the cognitive style of the bilingual school was in addition to the identification of the preferred cognitive style of the children with observational criteria and the correlation of that data with other instruments of cognitive style. This meta-analysis is meant to provide a framework to describe the bilingual schooling context.

The special status of the researcher and its resultant ambiguity was noted by all. Children would frequently leave their seat or place to address the researcher or speak to her out of turn. Teachers would often ask her to participate in an activity or contribute further information. Children were concerned whether the researcher was bored with the observation of seatwork. Teachers often

sought advice or sounded their concerns and problems to the researcher. At times the researcher unknowingly broke an established custom or particular procedure and was corrected by a staff member or principal. The curiosity that the researcher provided was reflected by her special status and treatment by all, or at times by the lack of knowing what her status was and how to treat her. The motivation stimulated in the children's CEFT test performance was noted by the researcher. The children seemed to want to do well and took their time so as to enhance their scores. Likewise, performance on the Perceptual Acuity Test was also noted by the unusual gaiety surrounding the group exercise. The children's frustration over the difficulty of the PAT may have been compensated for by their guessing the answer on items of the multiple choice test. However, the non-threatening appeal of all the testing stimulated the children to follow through with their best. None of the activities counted as a grade, and the researcher had no reason to speak crossly to the children, discipline them, or reprimand social deviants. The researcher tried to maintain her neutrality and establish friendly rapport with all; she felt uncomfortable whenever she was called upon in an amibigous situation to watch a class, instruct, or give advice. Her acceptance by the population studied was rewardingly favorable, and the cooperation given by every individual at all levels was appreciated beyond measure.

The motivation of the children to find the embedded figures of the CEFT introduces a metaphoric analysis similar

to the interpretation of rods and frames in the schooling context. The chief difference between a rod-and-frame test and an embedded figure test in measuring perceptual differences is the movement in a three dimensional context versus articulating a predetermined shape in a motionless situation without depth. The static display of an embedded figure poses more of an intellectual problem than an instrument that deals with concrete, tactile, physical manipulation. Embedded figure disembedding relies on visual discrimination. Although the Manual (1971) reports correlation of sensory responses, the distinction between the two concepts of instrumentation is irrelevant to the metaphoric analogies theorized in this analysis.

Since embedded figures are visual perceptual discriminations, they are likened to the type of learning that characterizes schooling practices of intellectual problem solving. Few learning activities are, unfortunately, concrete experiences. In art class a child might be able to manipulate a ball of clay; in physical education a child may touch a ball or experience kinesthetic learning. Typing, auto mechanics, and sewing in high school are other vocational classroom examples that appeal to the field dependent learner. Meanwhile, reading, language, mathematics, and sciences maintain themselves as textbook subjects that are considered the most important academically but are all too frequently taught as if they were embedded figures to be differentiated from complex fields. Furthermore, these subjects are treated with monastic

reverence. Just as the administrator of the CEFT may show the figure to be found between fields, it is up to the examinees to find that hidden figure on their own or else lose points. No reward is given for learning from the instructor where the embedded figure lies, for the test is not given a second time. This type of instruction and learning is analogous to the task-oriented, individual seatwork experience in the classroom, where the teacher seeks to provide cues that may lead to the discovery of the embedded figure. The process of individually disembedding a figure under the direction of the teacher is the most frequently employed method of transferring analytic skills and information into the cognitive structures of learners.

What the individual ultimately learns from the process of disembedding countless figures from more and more complex fields can be considered a hidden curriculum that he/she eventually accepts or rejects. If the figure disembedded is meaningful to the learners, they will adjust themselves to the contextual rod and frame; if neither the content nor the process carry any meaning, the learners deviate by rejecting the embedded curriculum. The lesson that a process teaches is more powerful than the implied content. The lesson that the test of embedded figures teaches is that there are more ways than one of teaching as well as learning. Cognitive style and sensory modality can be exploited by schooling institutions to promote different ways of learning through different modes of teaching if awareness of their significance is perceived.

Conclusion

Meta-awareness of the significance of cognitive style was illustrated through the examples of rods and frames, psychological differentiation, and embedded figures. The theoretical analysis of these terms as they relate to the dimension of field independence/field dependence was explored in this in-depth multi-methodology that formulates a qualitative interpretation of the process of collecting empirical data in the complex setting of a bilingual school. Both the methodology and the multi-methodology are intended to illuminate the provoking observation of incongruency: the researcher observed field dependent teachers in field independent school structures teaching field dependent students field independently.

CHAPTER V
QUANTITATIVE FINDINGS OF THE STUDY

This chapter presents the quantitative findings based on a statistical analysis of the data. These quantitative findings are in addition to the qualitative analysis, the multi-methodology, presented in the preceding chapter. The quantitative and qualitative analyses are considered complementary to each other in the interpretation of the data.

The quantitative findings are presented in terms of the research questions posed for this investigation, namely, whether there are differences in cognitive style among the three ethnic groups, the two sexes, and the four grade levels studied. In addition, there is the question of whether there is a correlation among the three different instruments of the multi-method approach utilized for this research. These research questions were investigated in order to provide a better understanding of learning style differences among various ethnic groups in the public school, since the review of the literature indicated the need for more basic research on this question. Gender and age were included since they are the most frequently used independent variables in studies of the construct of cognitive style. The multi-method approach necessitated a correlational analysis of the instruments since little is

known about the relationship of various instruments purporting to measure field independence/field dependence.

To analyze the data obtained from the CRFFIOB/CRFFSOB instrument set a chi-square test of significance was performed due to the categorical nature of the dependent variable. To analyze the data obtained from the Children's Embedded Figures Test and the Perceptual Acuity Test three-way analysis of variance was performed on the data of each of these two instruments to determine the effects of ethnicity, sex, and grade level. In addition, the reliability of these two instruments was quantitatively assessed in order to assist in the interpretation of the data as well as to put the findings in the perspective of previous research. The statistical analysis of the data which employed the Statistical Package for the Social Sciences (SPSS) follows the order of the research questions as they were enumerated in Chapter I in the original statement of the problem of identifying cognitive style.

Ethnic Differences in Cognitive Style

The first hypothesis to be tested investigates the question of whether there are ethnic differences in learning style. The three ethnic groups under consideration are Anglo, Black, and Mexican migrant children from the rural elementary schools at Pierson and Seville. The null hypothesis states that there will be no difference between these three different ethnic groups. The evidence from the three different tests for cognitive style regarding ethnicity is as follows.

Since the dependent variable for the CRFFIOB/CRFFSOB instrument set is categorical (field independent or field sensitive) a chi-square analysis was required. The chi-square tests for ethnic group differences (see Table 1) revealed no significant differences. Therefore, the null hypothesis, namely, there are no ethnic group differences in cognitive style, must be accepted for the CRFFIOB/CRFFSOB. The results of further chi-square tests for ethnic group differences at individual grade levels showed significance of ethnic group only at the sixth grade. With 2 degrees of freedom the chi-square was 7.155 with a significance of .0279 ($p < .05$) (see Table 2).

Regarding the CEFT, the analysis of variance procedure could be conducted since the dependent variables were not nominal but could be scaled from 0-25, depending on the correct number of embedded figures scored by each child. A 3-way ANOVA for CEFT with respect to sex, grade, and ethnicity (see Table 3) produced only one significant interaction. This was an ethnicity by sex interaction: for 2 degrees of freedom and a mean square of 63.126, F (2,271) equaled 3.259, with the significance of .040 ($p. < .05$). Therefore, it was necessary to conduct a series of Bonferoni-t multiple comparison tests to determine the nature of the interaction.

To reveal the ethnic group by sex interaction, the mean scores for the Anglos, Blacks, and Mexican migrants were plotted for each sex (see Figure 1). The Bonferoni-t procedure showed significant differences in ethnic group

Table 1
CRFFIOB/CRFFSOB Assessment of Cognitive Style for Ethnicity

Observation	Anglos	Blacks	Mexicans	Total
Field Dependent	105	34	36	175
Field Independent	70	16	11	97
Total	175	50	47	272

Chi-square = 4.805, Significance = 0.0905 ($p > 0.05$)

Table 2
CRFFIOB/CRFFSOB Assessment of Cognitive Style for Ethnicity
at the Sixth Grade Level

Observation	Anglos	Blacks	Mexicans	Total
Field Dependent	14	8	7	29
Field Independent	25	4	2	31
Total	39	12	9	60

Chi-square = 7.155, Significance = .0279 ($p < .05$)

Table 3
Three-Way Analysis of Variance of CEFT Scores

Source of Variation	Sum of Squares	Degree of Freedom	Mean Square	F	Significance of F
Main Effects	1295.016	6	215.836	11.142	
Ethnicity	312.853	2	156.426	8.075	0.000
Grade	809.675	3	269.892	13.933	0.000
Sex	0.001	1	0.001	0.000	0.995
2-Way Interactions	313.743	11	28.522	1.472	0.142
Ethnicity by Grade	202.175	6	33.696	1.740	0.112
Ethnicity by Sex	126.253	2	63.126	3.259	0.040
Grade by Sex	8.321	3	2.774	0.143	0.934
3-Way Interactions	30.474	6	5.079	0.262	0.954
Ethnicity by Grade by Sex	30.474	6	5.079	0.262	0.954
Explained	2059.933	23	89.562	4.624	0.000
Residual	4803.985	248	19.371		
Total	6863.918	271	25.328		

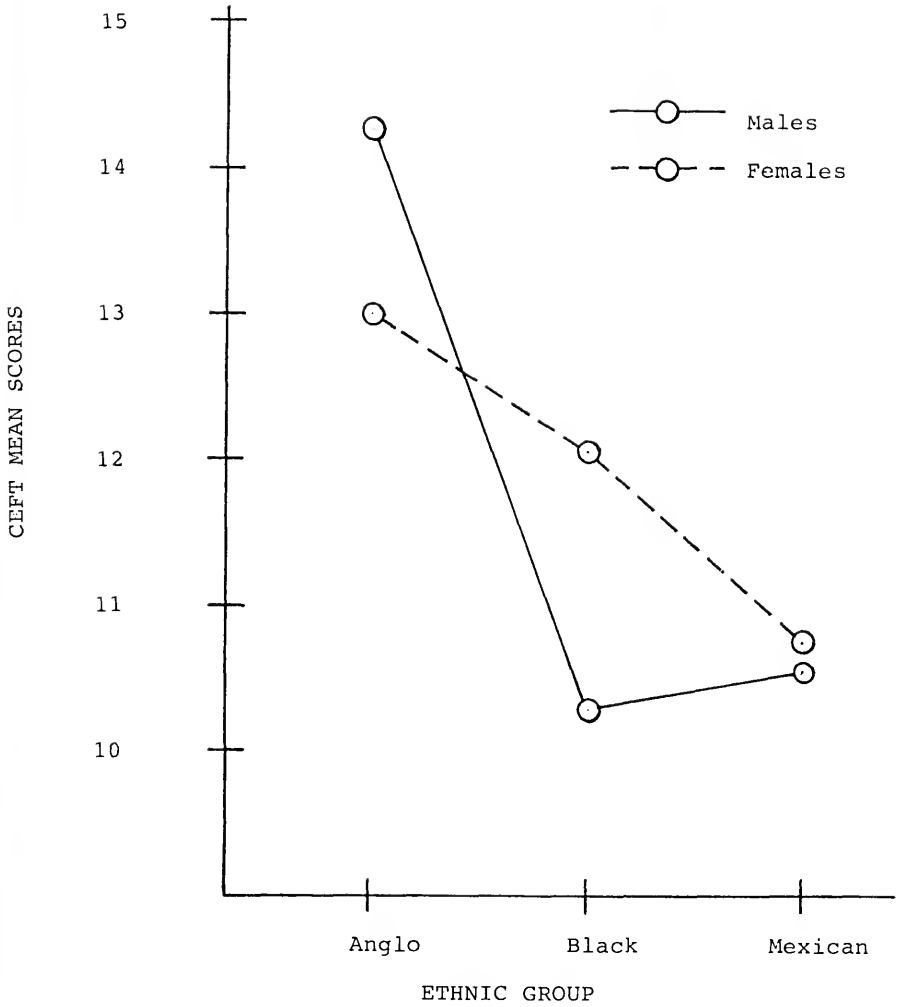

Figure 1. Sex by Ethnicity Interaction for CEFT
$F\ (2,271) = 3.259,\ p < .05$.

CEFT scores for males but not for females. There was a significant difference in males between Mexican migrants and Anglos and between Blacks and Anglos, but there was no significant difference between Mexican migrants and Blacks (see Table 4). For females there were no significant differences between any of the ethnic group combinations. The conclusion that can be drawn from these results regarding the null hypothesis of no differences between ethnic groups is that for males there is a significant difference between the majority Anglo group and the minority ethnic groups. The difference between the minority groups themselves, however, is not significant. For females the conclusion is that there is no significant difference among any of the three ethnic groups on the CEFT for cognitive style. Therefore, the null hypothesis regarding ethnicity is accepted for the CEFT.

The PAT, a 30 question multiple-choice test, also produced continuous data like the CEFT. A 3-way analysis of variance for the PAT (see Table 5) resulted in a significant interaction between ethnicity and grade; for 6 degrees of freedom and a mean square of 39.822, $F(6,271)$ equaled 2.854 with a significance of .010 ($p < .05$). Therefore, it was necessary to conduct a series of Bonferoni-t multiple comparisons tests to determine the nature of the interaction.

To reveal the ethnic group and grade interaction, the mean PAT scores for the Anglos, Blacks, and Mexican migrants were plotted versus grade level (see Figure 2). The

Table 4
Multiple Comparison of CEFT Scores Using Bonferoni-t Statistics for Male Ethnicity

Groups Compared	Difference Between Mean Scores	Significant Difference at $p < .05$
Male Anglos and Male Blacks	3.980	2.259
Male Anglos & Male Mexicans	3.714	2.438
Male Mexicans & Male Blacks	0.2658	2.259

Homogeneous Subsets*

Subset 1		
Group :	Male Blacks	Male Mexicans
Mean CEFT Score :	10.2759	10.5417
Sample Size :	29	24
Subset 2		
Group :	Male Anglos	
Mean CEFT Score :	14.2558	
Sample Size :	86	

* Subsets within which differences between means are not significant.

Table 5
Three-Way Analysis of Variance of PAT Scores

Source of Variation	Sum of Squares	Degree of Freedom	Mean Square	F	Significance of F
Main Effects	105.420	6	17.570	1.259	0.277
Ethnicity	3.803	2	1.902	0.136	0.873
Grade	89.405	3	29.802	2.136	0.096
Sex	26.864	1	26.864	1.925	0.167
2-Way Interactions	293.934	11	26.721	1.915	0.038
Ethnicity by Grade	238.932	6	39.822	2.854	0.010
Ethnicity by Sex	24.039	2	12.020	0.861	0.424
Grade by Sex	58.735	3	19.578	1.403	0.242
3-Way Interactions	109.302	6	18.217	1.306	0.255
Ethnicity by Grade by Sex	109.302	6	18.217	1.306	0.255
Explained	449.742	23	19.554	1.401	0.110
Residual	3460.184	248	13.952		
Total	3909.926	271	14.428		

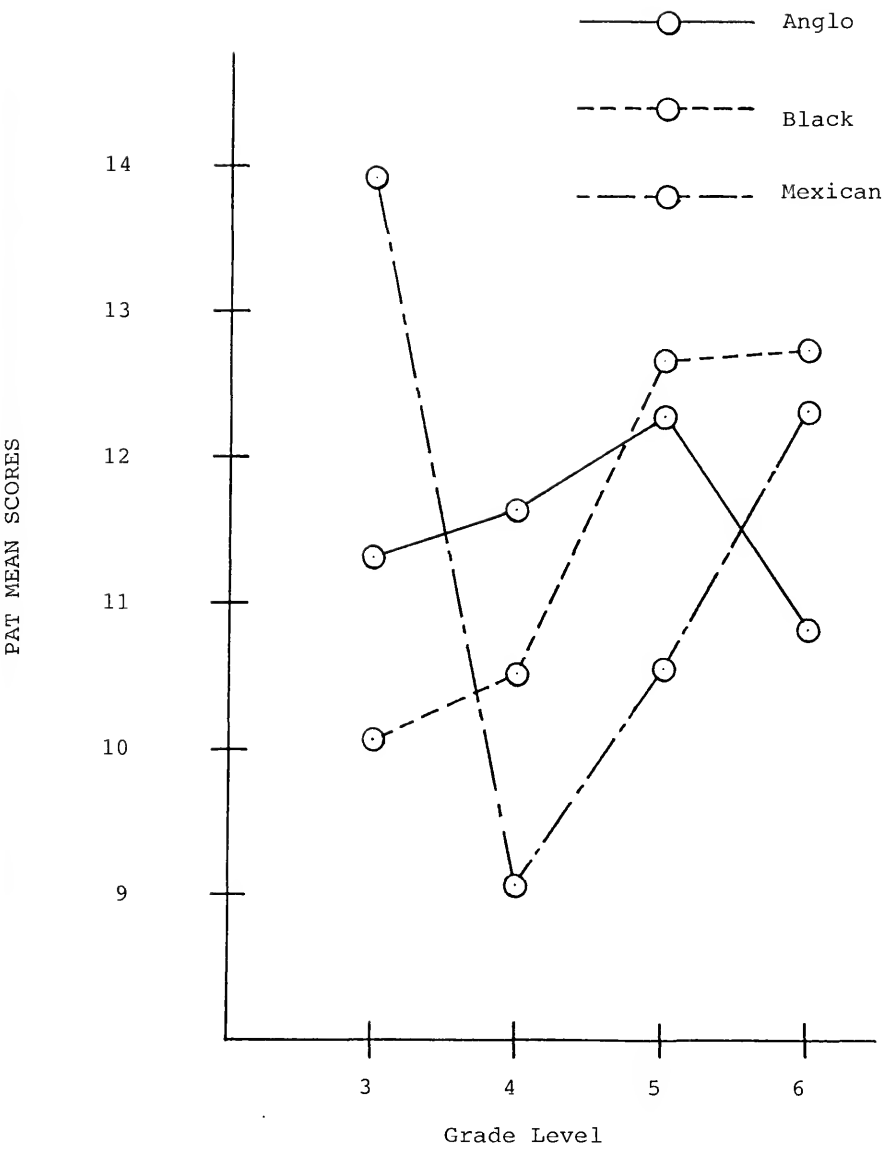

Figure 2. Ethnicity by Grade Interaction for PAT.
$F\ (6,271) = 2.854,\ p < .05$

Bonferoni-t procedure showed only one significant comparison out of the twelve made. The interaction was produced by the significant difference between the Blacks and Mexican migrants at the third grade. For this reason the conclusion that there are no significant differences between ethnic groups must also be drawn for the PAT. Furthermore, the spurious results of the ANOVA for the PAT indicate that its analysis does not provide fruitful information.

In summary, the results of the chi-square analysis for the CRFFIOB/CRFFSOB and of the ANOVA analyses for both the CEFT and the PAT demonstrate no consistently measurable difference in cognitive style across ethnic groups. Therefore, the null hypothesis is accepted, namely that there are no cross-cultural differences in learning style based on the results of the three instruments employed.

Sex Differences in Cognitive Style

The second hypothesis to be tested deals with the question of whether there are sex differences in learning style. The two sexes were categorized by the male and female genders of the students being identified for cognitive style at Seville and Pierson elementary schools. The null hypothesis states that there will be no difference between the male and female students being studied. The evidence from the three different tests for cognitive style regarding sex differences is as follows.

The chi-square test of the CRFFIOB/CRFFSOB instrument set showed no significance regarding sex (see Table 6). The conclusion is to accept the null hypothesis, namely,

Table 6
CRFFIOB/CRFFSOB Assessment of Cognitive Style
for Sex

Observation	Males	Females	Total
Field Dependent	89	86	175
Field Independent	50	47	97
Total	139	133	272

Chi-square = .00031, Significance = 0.9859 ($p > .05$)

that there are no demonstrable sex differences measured by the CRFFIOB/CRFFSOB instrument set.

The results for the 3-way ANOVA for CEFT (Table 3) have already been partially interpreted due to the ethnicity by sex interaction produced. Here the focus is on the results regarding sex differences (see Figure 1 again). The Bonferoni-t analysis of the ethnicity by sex interaction for CEFT showed a significant difference between Mexican migrants and Anglos and for Blacks and Anglos with no difference between Mexican migrants and Blacks, but for males only (see Table 4). For females there was no significant difference between ethnic groups whatsoever. And, to be sure, there was no main effect produced for sex differences either. Therefore, the logic for accepting the null hypothesis regarding sex differences is the same as the ethnicity null hypothesis for CEFT: if the results are not significant for both sexes or all ethnic groups tested, then the null hypothesis, which states that there are no sex differences, must also be accepted for the CEFT just as the ethnicity null hypothesis was accepted for it.

For the PAT no significant main effects, 2-way interactions, or 3-way interactions were produced regarding sex differences (see Table 5). Therefore, the conclusion is the immediate acceptance of the null hypothesis: there are no sex differences whatsoever demonstrated by the PAT.

Grade Level Difference in Cognitive Style

The third hypothesis to be tested concerns the question of whether there are grade level differences in learning

style. The particular grade levels scrutinized were the third through the sixth grades. All available students in these grade levels at Seville and Pierson elementary schools were measured for cognitive style. Only those students for whom data were obtained on all three measures were included in this study. The null hypothesis states that there will be no differences between the third, fourth, fifth, and sixth graders who were tested for field independence/field dependence. The evidence regarding grade level differences from the three different instruments used to measure cognitive style is as follows.

The chi-square test of the CRFFIOB/CRFFSOB for the total population produced a significant result for field independent and field dependent students by third, fourth, fifth, and sixth grades. For 272 students and 3 degrees of freedom, the chi-square was 9.666 with a significance of .0216 ($p < .05$) (see Table 7). When grade level was further broken down by ethnic group, only the chi-square test for the Anglo population proved to be significant. For 175 Anglos and 3 degrees of freedom the chi-square was 12.80 with a significance of .0051 ($p < .05$) (see Table 8). Further grade level support was revealed in the chi-square test for grade level by sex which proved significant for males only. In this breakdown for 139 males and 3 degrees of freedom the chi-square was 11.27 with a significance of .0103 ($p < .05$) (see Table 9). This is to say, significance of the chi-square test for grade level differences is being heavily dominated by the Anglo male population, which

Table 7
CRFFIOB/CRFFSOB Assessment of Cognitive Style
for Grade Level

Observation	Third Grade	Fourth Grade	Fifth Grade	Sixth Grade	Total
Field-Dependent	42	51	53	29	175
Field-Independent	21	26	19	31	97
Total	63	77	72	60	272

Chi-square = 9.666, Significance = .0216 ($p < 0.05$)

Table 8
CRFFIOB/CRFFSOB Assessment of Cognitive Style
for Grade Level,
for Anglos only

Observation	Third Grade	Fourth Grade	Fifth Grade	Sixth Grade	Total
Field-Dependent	24	32	35	14	105
Field-Independent	13	18	14	25	70
Total	37	50	49	39	175

Chi-square = 12.80. Significance = 0.0051 ($p < 0.05$)

Table 9
CRFFIOB/CRFFSOB Assessment of Cognitive Style
for Grade Level,
for Males only

Observation	Third Grade	Fourth Grade	Fifth Grade	Sixth Grade	Total
Field-Dependent	21	26	32	10	89
Field-Independent	13	12	9	16	50
Total	34	38	41	26	139

Chi-square = 11.27, Significance = 0.0103 ($p < 0.05$)

constitutes a majority over the Blacks and Mexican migrants as well as the females in all categories. The conclusion drawn from the evidence, however, still leads to the acceptance of the research hypothesis, namely that there is a difference in grade level for cognitive style.

The 3-way ANOVA for the CEFT instrument, however, resulted in a main effect for grade level (see Table 3). At 3 degrees of freedom with a mean square of 269,892, F (3.271) equaled 13.933, with a significance of .000 ($p < .05$). This main effect for grade level was further broken down and analyzed with the Bonferroni t-test for multiple comparisons (see Table 10). The results of these comparisons showed that significant differences exist between grades 3 and 4, between 3 and 5, between 3 and 6, between 4 and 6, and between 5 and 6. No significant difference, however, exists between grades 4 and 5. These comparisons show that five out of six comparisons are significant for all grade levels. Furthermore, the progression of significant group mean differences is in developmental order. The comparison between grades 4 and 5 show that this difference in means is insignificant, that these two particular grades are more alike or less distinguishable than all the other contrasts. This developmental arrangement is also graphically illustrated by the ordering of subsets in Table 10. Therefore, the conclusion in this case is the rejection of the null hypothesis and the acceptance of the research hypothesis for the CEFT, namely, that

Table 10
Multiple Comparison of CEFT Scores Using Bonferoni-t Statistics for Grade Level

Groups Compared	Difference Between Mean Scores	Significant Difference at $p < .05$
3rd & 4th Grades	2.1904	1.974
3rd & 5th Grades	3.6666	2.004
3rd & 6th Grades	6.1833	2.096
4th & 5th Grades	1.4761	1.905
4th & 6th Grades	3.9929	2.001
5th & 6th Grades	2.5167	2.031

Homogeneous Subsets*

Subset 1			
Group :	3rd grade		
Mean CEFT Score :	9.6667		
Sample Size :	63		
Subset 2			
Group :	4th grade		5th grade
Mean CEFT Score :	11.8571		13.3333
Sample Size :	77		72
Subset 3			
Group :	6th grade		
Mean CEFT Score :	15.8500		
Sample Size :	60		

* Subsets within which differences between means are not significant.

there are grade level differences. The CEFT instrument demonstrates the developmental theory of psychological differentiation that older children in higher grade levels are more field independent than youngsters in lower grade levels.

In the case of the PAT instrument the 3-way ANOVA produced only a two-way interaction for ethnicity by grade (see Table 5). This interaction has been discussed under the hypothesis for ethnic group. Since the only significant comparison found by contrasting the three ethnic groups at all grade levels was between Blacks and Mexican migrants at the third grade level, the results were considered spurious. The conclusion, therefore, is the acceptance of the null hypothesis, namely, that there are no grade level differences demonstrated by the PAT instrument.

In summary, the results of the CRFFIOB/CRFFSOB and the CEFT instrument as analyzed by the chi-square and 3-way ANOVA, respectively, lead to the acceptance of the research hypothesis. In this case there are grade level differences demonstrated by these two instruments. The 3-way ANOVA for the PAT instrument results in the acceptance of the null hypothesis that there are no differences between grade levels. The results of the PAT are deemed uninterpretable due to their spurious nature. The overall conclusion, therefore, is that the grade level differences support the theory that the construct is indeed developmental, that there is a difference in cognitive style by grade level.

Instrument Correlation

The fourth hypothesis to be statistically tested (see Chapter I) states that there will be no correlation among the three different instruments used to identify cognitive style. Correlations between CRFFIOB/CRFFSOB and PAT, between CRFFIOB/CRFFSOB and CEFT, and between CEFT and PAT were made. Because the dependent variable of the CRFFIOB/CRFFSOB instrument set is nominal (field independence/field sensitivity), a point biserial correlation for the observational categorical variable was made. However, absolutely no difference was found between the point biserial calculations and the Pearson correlations coefficients computed by SPSS for all three of the instruments (see also Cohen and Cohen, 1975; Guilford and Fruchter, 1978). Therefore, Pearson correlations were employed for all instruments in the correlational analysis.

For CRFFIOB/CRFFSOB and PAT no significant Pearson correlations existed whatsoever.

For CEFT and PAT only one significant correlation existed, a spurious negative correlation for all females. The Pearson correlation coefficient equaled -.1752 with a significance of .044 ($p < .05$).

For the CRFFIOB/CRFFSOB and CEFT instruments several significant Pearson correlations did exist. For the entire population the Pearson correlation coefficient equaled .2379 with a significance of .001 ($p < .05$). Another ethnic group by sex breakdown produced a significant correlation for

Black females. For Black females the Pearson correlation coefficient equaled .4555 with a significance of .038 ($p < .05$). For all females, however, the Pearson correlation coefficient equaled .3458 with a significance of .001 ($p < .05$). Two additional significant correlations were produced for grade level. For the fifth grade the Pearson correlation coefficient equaled .3615 with a significance of .002 ($p < .05$). For the sixth grade the Pearson correlation coefficient equaled .3918 with a significance of .002 ($p < .05$).

Notwithstanding the fact that there were eight significant correlations between the dependent variables of the CRFFIOB/CRFFSOB and CEFT instruments, none of these Pearson correlation coefficients attained even a value of .5 or higher. These trends are therefore not high enough to warrant acceptance of the research hypothesis. This, together with the lack of significant correlation between the CRFFIOB/CRFFSOB and PAT and between the CEFT and PAT instruments leads to the acceptance of the null hypothesis, namely that there is no correlation among the instruments used herein to identify cognitive style.

Instrument Reliability

Acceptance of the null hypothesis was required for all four research hypotheses with one exception. For both the CRFFIOB/CRFFSOB and the CEFT instruments the research hypothesis was accepted for grade level. The CEFT and CRFFIOB/CRFFSOB instruments supported cognitive style theory

that field independence/field dependence is developmental with chronological age maturation. The repeated acceptance of the null hypotheses in all other cases for ethnic group, sex, and age differences, as well as lack of substantial correlation among the three research instruments, brings to bear the question of instrument reliability. Hence, the CEFT and PAT instruments were further subjected to tests of reliability. The CRFFIOB/CRFFSOB instrument set was not tested for reliability since it is a checklist for observable behaviors producing nominal data. The lack of correlation among the three instruments produced the final support that reliability estimates were in order.

To test the CEFT instrument for reliability it was subjected to the KR-21 procedure. The dichotomous answer system of either correct or incorrect responses made this test the appropriate one to measure the reliability of the CEFT instrument. The KR-21 reliability was computed as .7846 for the CEFT instrument. This high reliability for the CEFT instrument supports its findings on the developmental nature of cognitive style.

On the other hand, the PAT was subjected to a different test of reliability. Since the multiple choice answers for the thirty items had five possibilities the appropriate reliability test for the PAT was the coefficient alpha procedure. A random sample of sixty student responses was chosen out of the 272 total. The results of the coefficient alpha reliability estimate equaled -.0104. This negative

reliability coefficient is considered as further evidence to support the conclusion that the results of the PAT were indeed spurious. All four null hypotheses were accepted for the PAT instrument, namely that there were no differences in cognitive style for ethnic group, sex, or grade level as well as no correlation with the other two instruments. The acceptance of the three null hypotheses for the CRFFIOB/CRFFSOB and of three of them for the CEFT made the following conclusions reasonable: the correlations between these two instruments, though positive, were low, and the CEFT and CRFFIOB/CRFFSOB were developmental. Negative findings and insignificant relationships for the PAT instrument, however, made this instrument suspect from the beginning as unreliable. That the results of the PAT are spurious is further supported by the negative coefficient alpha reliability estimate.

Discussion

The differences between instruments which have been developed for measuring cognitive style produce some of the variability in the literature on cross-cultural research for Mexicans as well as other ethnic groups. The instrument employed may show a difference in learning style, depending on its particular nature. Group, individual, and observational instruments exist. These instruments can be further classified as laboratory or field instruments. The validity of the construct of cognitive style can be

investigated only if the original instruments designed to measure its existence are sensitive enough to perceive it. Furthermore, studies that utilize just one type of instrument may be limited in the information they hope to generalize. Therefore, research with a multi-method approach and a multi-method methodology may be more useful in answering some of the questions about the construct, theories and instruments of cognitive style. This research, using both quantitative and qualitative methods, has approached the measurement of cognitive style with three different instruments that purport to identify field independence/field dependence.

The purpose of the research is another factor to be considered in selecting an appropriate instrument to assess learning style. The quantitative results of this study clearly identify the CEFT instrument as the best research instrument of the three. If the intent is teacher training, then the CRFFIOB/CRFFSOB instrument set suits that purpose better. Although this research shows only a very low correlation between the CEFT and the CRFFIOB/CRFFSOB instruments, perhaps future research would lend more insight into the relationship between psychological and observational instruments.

The CRFFIOB/CRFFSOB and the CEFT instruments account for acceptance of three of the four null hypotheses studied in this investigation, that there were no differences in cognitive style for ethnic group and sex, and no instrument

correlations. Table 1 for the CRFFIOB/CRFFSOB instrument set shows that 175 students out of 272 were identified observationally as preferring the field dependent or field sensitive cognitive style. This means that only 97 were identified as preferring the field independent learning mode. In terms of percentages, 64% of the total population was field dependent while the remaining 36% was field independent. Roughly speaking, almost two-thirds of the student population was identified as field dependent with the CRFFIOB/CRFFSOB instrument set. This quantitative analysis parallels the qualitative finding of the researcher, namely that the student population (and teachers, principals, and staff for that matter) were observed by and large to be field dependent. The field dependency of the human population contrasted with the field independency of the school structure, and the incongruency of the teaching styles of the teachers whose own learning styles were largely field dependent were contrasted by the researcher in her qualitative analysis, in Chapter 4.

Furthermore, the chi-square analysis for the CRFFIOB/CRFFSOB instrument set indicated that its results were heavily influenced by the domination of the Anglo population Anglos numbered 175 out of a total of 272 children (see Table 8). Of these 175 Anglos 105, or 60%, were identified as field dependent while only 70, or 40%, were rated as field independent. This leaves only 97 students left to account for the Black and Mexican migrant groups. Of the Blacks, 34, or 68%, were field dependent while 16, or 32%,

were field independent. Of the 47 Mexican migrants, 36, or 76% were field dependent while 11, or 23%, were field independent. This further data is to illustrate that field dependency was identified as well as observed in the total population, even though the chi-square test was significant only for Anglos at all grade levels.

A similar argument holds for males regarding the CRFFIOB/CRFFSOB instrument set. A little more than half of the total population was male, although 89, or 64%, were identified as field dependent while 50, or 36%, were field independent.

The heavily field dependent population was observed by the researcher to be highly motivated on the CEFT instrument individual exercise. This tendency to do well may be explained in part by the significant main effect for CEFT by grade. The rejection of the null hypothesis in this instance to support the claim of the developmental nature for cognitive style does not invalidate the observation made by the researcher that the student population was by in large field dependent. The relative field dependency of the Seville and Pierson student population may be compared to the normative data given in the Manual (Witkin et al. 1971). The ages and grade levels of the two comparisons are not analogous; however, the relative field dependency of the research population can still be illustrated by the example.

The insignificance of all of the PAT instrument data may be explained in part by group behavior. The tendency to guess or Christmas-tree the multiple choice responses

probably caused the spurious results that were statistically demonstrated to be unreliable. A case example may also shed some light on the statistical insignificance of the PAT instrument data. In the course of testing students who had missed the group exercise the researcher discovered a newly arrived Mexican migrant who had never taken a multiple choice test in his life. Shortly after the make-up test was begun the researcher noticed the difficulty of the individual in responding to the answer sheet. After it was explained to the child to mark only one response to each item, this Mexican male conformed to the same behaviors as his companion and successfully completed the answer sheet without comprehending the relationship between the visual-aural stimuli and the selection of the best response. Guessing on the part of students for a novel and difficult perceptual instrument probably undermined the results of the data more than anything else.

That little is known about field dependency is illustrated by the need of Ramirez and Castaneda (1974) to extend the theory of cognitive style to the special case of the Mexican. The thrust of their work is to show that field dependency, or field sensitivity as they call it, is not an inferior or lesser cognitive style. The review of the literature also shows that the placement of field dependency into the cultural or social domain defies easy categorization (Knight et al., 1978; Sanders et al., 1976; Kagan, Zahn, Gealy, 1977). While it is easy to place field independence into the cognitive domain and easier to

construct instruments that measure field independence, little is known about field dependency in comparison to its bipolar counterpart. The attribution of field dependency to minority groups contributes to the negative value assigned to it (Gay, 1978). The valuing by school structures of field independence further adds to the less prestigious position of field dependency (Cohen, 1969). The fact, however, that many Anglos are also field dependent is somehow lost when they are compared to minority groups for cognitive style. Notwithstanding the acceptance of the null hypothesis for minority groups for all three of the cognitive style instruments used in this research, two different cognitive styles were identified in the classrooms while just one receives the attention of the institutional school structure. To be sure, that cognitive style is field independence.

Summary of Major Findings

The quantitative and qualitative analyses for the CEFT, CRFFIOB/CRFFSOB, and PAT instruments can be summarized as follows.

1) There are no differences in cognitive style among the three different ethnic groups as measured by the three different instruments employed.
2) There are no differences in cognitive style between the two different sexes as measured by the three different instruments employed.

3) There is a difference in cognitive style among the four different grade levels measured by two of the instruments employed. The CRFFIOB/CRFFSOB instrument set and the CEFT instrument support the theory of the developmental nature through maturation of the field independent dimension of the construct of cognitive style. However, the PAT instrument shows no difference in grade level.

4) There is no correlation among the three different instruments employed to identify cognitive style.

5) The CEFT instrument is reliable for purposes of psychological research to identify the field independent dimension of the construct of cognitive style.

6) The PAT instrument is unreliable and proved to be insignificant for purposes of quantitative research to identify the field independent dimension of the construct of cognitive style.

7) The CRFFIOB/CRFFSOB instrument set supports the qualitative finding that the preferred cognitive style of the population sampled was field dependent. Moreover, while the quantitative research value of the CRFFIOB/CRFFSOB instrument set is unknown, it served a valuable purpose as a teacher training device to promote the concept that there is more than one style of learning.

CHAPTER 6
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A brief summary of the preceding five chapters will begin this sixth and final chapter. Chapter I stated the problem of identifying cognitive style in the bilingual school. It was pointed out that Witkin and his colleagues (1977a) theorized the construct of cognitive style with its dimension of field independence/field dependence and that Ramirez and Castaneda (1974) extended this theory to the special case of the Mexican American. The purpose of this study was to determine whether there were cross-cultural learning style differences in the bilingual school that is predominantly Anglo and to promote awareness that more than one mode of learning does exist. Whereas individuals may learn in more than one way, the school promotes just one basic mode of learning (Cohen, 1969). The bilingual school is placed in the unique position of fostering more than one cognitive style when it serves an acculturating clientele that embodies the need for recognizing cross-cultural learning style differences. To better understand cognitive style, a background of the construct was given in Chapter I along with various of its definitions and characteristics. In addition to a statement of the hypotheses to be tested regarding cognitive style, a review of some of the principal instruments that measure cognitive style was presented. The

significance of the present study was stated in terms of the multi-method approach and multi-method methodology utilized to identify cognitive style among three major ethnic groups (Anglo, Black, Mexican) found in the rural elementary schools of Pierson and Seville, Florida. The chief limitations of the study concern the generalizability of the quantitative findings to other geographic and urban areas. For that reason it was pointed out that the qualitative analysis of Chapter 4 would serve to interpret the data by providing a meta-analytic overview. The very instruments chosen to identify cognitive style were also a limitation, indicating the need for more multi-method studies to develop and improve instruments designed to measure the construct.

The review of the literature in Chapter 2 organized the studies to date into Anglo, Black, and Mexican research; Anglo and Mexican American research; related research; geographically related research; and landmark research. Inconsistencies were found in the cross-cultural studies of Mexican Americans and Anglos done in the United States. Research involving Mexicans and Anglos produced significant differences in cognitive style. The difference in research findings not only underscores the relativity of the construct, but also emphasizes the need for more basic research to determine what factors are influencing field independence/field dependence in various ethnic groups. Little norming data for the construct exists (Witkin et al., 1971), and lack of understanding of the shift in cognitive style of acculturating groups suggests that even more

research is required to explain the inconsistencies among cross cultural research done in different geographic areas, in different contexts, and with different instruments.

Chapter 3 described the methodology employed to collect the data for quantitative analysis. The three instruments included two traditional psychological tests of perception, the Children's Embedded Figures Test (CEFT) and the Perceptual Acuity Test (PAT), and a third instrument, the Child Rating Form Field Independent Observable Behaviors/Child Rating Form Field Sensitive Observable Behaviors (CRFFIOB/CRFFSOB), which was observational. Since three measures of cognitive style were taken on each subject, a repeated measures design was chosen. To process the data statistically, analyses of variance, chi-square tests, and computations of correlation coefficients were required in order to test the research hypotheses that there would be no ethnic group, sex, or grade level differences in cognitive style among the three different ethnic groups sampled as well as no correlations among the three different instruments utilized to identify field independence/field dependence. The selection of the sites and subjects was also described. The rural bilingual elementary schools of Pierson and Seville were chosen for their tri-ethnic group combination that included Mexican migrant as well as Black and Anglo children. The description of the instruments included administration procedures. The procedure for recording a data profile was explained and operational definitions of the construct were given. A description of

the data processing was given to facilitate the interpretation of the quantitative findings to be found in Chapter 5. Furthermore, the data were additionally subjected to qualitative scrutiny by means of meta-analysis in Chapter 4. The assumptions and limitations of this research include the facts that the chosen research sites were previously unstudied except for Smith (1980), and that the three instruments employed to identify cognitive style had never been used in combination, as done herein.

Chapter 4, the multi-methodology, provided a qualitative overview of the findings of both the multi-method approach and the multi-method methodology. Both psychological and observational data had been collected for statistical analysis. The collection and interpretation of all of this quantifiable data were subjected in Chapter 4 to the researcher's interpretation, or qualitative analysis, which provided a framework for understanding the acceptance of so many of the research hypotheses on the basis of the quantitative statistics in Chapter 5. The researcher, who was also functioning as an observer in the course of data collection, described the two bilingual schools and how observation was conducted in these institutions. She further described the process of identifying cognitive style by each of the three instruments: the CRFFIOB/CRFFSOB set, the PAT and the CEFT. To better interpret the data and to better understand the construct of cognitive style as it relates to the concept of field, the researcher analyzed the relationship of rod-and-frames, psychological differentia-

tion, and figure embeddedness to the dimension of field independence/field dependence. The conclusion of Chapter 4 was not only that there was field dependence on the part of the subjects, teachers, principals, and staff alike, but also that the teaching style of the teachers conflicted with their personal learning style. The field independent teaching style that prevailed in the field independent school structure conflicted with the field dependent learning style of the teachers, and this incongruency may have been a principal factor influencing the majority preference among the subjects for the field dependent learning style.

Chapter 5 presented the quantitative analysis and major findings. The null hypotheses accepted were that there are no differences in learning style across sex and ethnic group and that there are no correlations among the instruments utilized to identify cognitive style. Two of the instruments, the CEFT and the CRFFIOB/CRFFSOB instrument set, did show a developmental difference in field independence/field dependence, i.e., by grade level; however, the PAT instrument did not show any grade level differences, nor did it prove to be a reliable instrument. The CEFT, on the other hand, demonstrated high reliability as a research instrument, while the CRFFIOB/CRFFSOB instrument set served well as a teacher training device for introducing the concept of cognitive style.

Conclusions

The most important finding of this investigation is that no difference in learning style existed among the Anglo, Black and Mexican students measured for cognitive style. It was also found that no sex differences in cognitive style existed within the three different ethnic groups studied. The grade level differences in cognitive style indicated by the CEFT and CRFFIOB/CRFFSOB instruments were of lesser interest, although the developmental nature of the construct was expected by theory. That no cross-cultural differences in learning style were demonstrated is inconsistent with theory, although conflicts in the literature assessing the cognitive style of Anglos and Mexican Americans were discussed in Chapter 2. The trend of the literature favors theoretical differences in learning style between Anglos and Mexican Americans of the Southwest. Nevertheless, the most important observation and conclusion is that the Anglo as well as the Black and the Mexican migrant children were by and large field dependent. The field dependence of the population sampled was verified by the CRFFIOB/CRFFSOB instrument set, rated by the teachers with the assistance of the researcher, as well as by the observations of the researcher. The researcher's observation of field dependence in the population sampled supported the conclusion that no cross-cultural learning style differences existed. However, since the purpose of this research was to identify cognitive style, the diversity of cross-cultural learning styles was nonetheless illustrated.

The second most important finding of this investigation is that no significant correlation existed among the instruments used to identify cognitive style. Although a very low, though significant, positive correlation existed between the CEFT and the CRFFIOB/CRFFSOB instruments, it was not large enough to justify acceptance of the research hypothesis. Therefore, the conclusion was drawn in favor of the null hypothesis, namely, that none of the three instruments purporting to measure field independence/field dependence correlated. This conclusion showed the importance of the multi-method approach in identifying cognitive style. Results and findings may be influenced by the particular instrument(s) employed. Conflicts in the literature comparing Anglo and Mexican American cognitive style may be due to differences in instrumentation, making it difficult to compare studies utilizing different kinds of tests and apparatus.

That no difference in cognitive style existed cross-culturally for the population sampled illustrated the relevance of the cultural milieu and of the schooling context to the development of learning style. The adaptation of the field dependent Mexican migrants, Blacks, and Anglos to the rural school environment showed a coping strategy that worked for their specific situation. The generalizability of this field dependency to another situation would not necessarily hold true if, for example, the Mexican migrants lived in a stable community where their language and culture were maintained. The field dependence

of the Anglos favored the adaptation of the Mexican migrants and allowed them to cope in a new situation that might otherwise have produced great acculturating conflict in a minority group.

That there was no correlation among the instruments employed to measure cognitive style was important, not only because few pieces of research have used a multi-method approach, but also because issues of instrument reliability and construct validity were at stake. Studies which propose to demonstrate cross-cultural differences in cognitive style utilizing only one kind of instrument are limited in value. Criticism of the validity of the construct of cognitive style must also be dealt with by relevant research.

Recommendations

Although it must be concluded that there are no significant differences in learning style among the three different ethnic groups measured for cognitive style, it must also be stated that two clearly different learning styles were observed. Anglos, Blacks, and Mexican migrants were all observed to be both field independent and field dependent, although the majority of each group of students was field dependent when compared to published norms (Witkin et al., 1971; Gough and McGurk, 1967). However, the unpreferred or less dominant field independent cognitive style was fostered and nurtured by the teaching style of the teachers and the school structure. Individual seat work in a time-allotted schedule was the most frequent pattern of instruction observed. Teacher rather than peer authority

dominated most group activities, even reading and math. The researcher's observation that the teachers were uncomfortable with the field independent mode of instruction suggested an incongruency in teaching style versus the cognitive style of the teachers. Therefore, the researcher recommends that field dependent teaching strategies and modes of instruction be implemented where primarily field-dependent student populations are taught by those who also prefer the field dependent cognitive style. It is further recommended that teachers in a bilingual school setting receive bilingual multicultural and cognitive style training either in their professional education or as part of their continuing education in order to deal with the problems of schooling a bilingual population.

The researcher recommends further research to identify cognitive style in cross-cultural school populations in order to determine the schooling needs of ethnic minority clientele. Applied research in the areas of cognitive style will promote schooling changes for all students, regardless of ethnic background, if the ways in which individuals learn are better understood. Replication of this research in similar tri-ethnic, rural school environments is recommended to determine whether the results of this research, utilizing the same instruments, can be reproduced. Further cognitive style research comparing urban school populations to rural ones is recommended as well. Furthermore, a longitudinal study of cross-cultural cognitive style would determine the true developmental nature of field independence/field

dependence. Likewise, it is recommended that further research be done to determine construct validity and instrument reliability where these issues are the sole concern. It is recommended that future cross-cultural cognitive style research should include other factors such as length of time in the United States and language proficiency as independent variables. In the same vein, research with the promising observational checklist approach to cognitive style identification, such as the CRFFIOB/CRFFSOB instrument set, has barely begun and it is recommended that it be continued since it is an area that needs further research. Finally, future research with observational instruments should include other behaviors such as the traits and characteristics that constitute good pilots.

APPENDIX A
LETTER OF PERMISSION TO DO COGNITIVE STYLE RESEARCH FROM VOLUSIA COUNTY BOARD OF EDUCATION

November 11, 1980

Ms. Connie D. F. Curtis
810 Palm Grove Court
South Daytona, Florida 32019

Dear Ms. Curtis:

After our discussion in this office yesterday and having examined your proposed test instruments for your requested research project in Seville and Pierson Elementary Schools, I contacted Mrs. Carson and Mr. Sellards of the respective schools. They have no objection to the administration of your research instrument as long as the amount of class time for students involved in the project is kept to a minimum.

This letter is to give my approval for your project and wish you every success in your educational endeavors. I would appreciate a copy of any written results obtained from your research.

Sincerely yours,

M. Lee Britton, Director
Research and Accountability

MLB:jmt

xc: Mrs. Gwen Carson, Principal
Seville Public School

Mr. Harry Sellards, Principal
Pierson Elementary School

Mrs. Belle Altice
Educational Development Center

CHILD RATING FORM
FIELD-SENSITIVE OBSERVABLE BEHAVIORS

Instructions: Evaluate the child for each behavior listed below by placing a check in the appropriate column.

An example

Child's Name _____ Grade _____ School _____ Date _____

Observer's Name _____

Global

Situation (e.g., "Math lesson"): for general or overall rating write "Global."

FIELD-SENSITIVE OBSERVABLE BEHAVIORS	FREQUENCY				
	NOT TRUE	SELDOM TRUE	SOMETIMES TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
RELATIONSHIP TO PEERS					
1 Likes to work with others to achieve a common goal					X
2 Likes to assist others				X	
3 Is sensitive to feelings and opinions of others					X
PERSONAL RELATIONSHIP TO TEACHER					
1 Openly expresses positive feelings for teacher				X	
2 Asks questions about teacher's tastes and personal experiences, seeks to become like teacher				X	
INSTRUCTIONAL RELATIONSHIP TO TEACHER					
1 Seeks guidance and demonstration from teacher			X		
2 Seeks rewards which strengthen relationship with teacher					X
3 Is highly motivated when working individually with teacher					X
CHARACTERISTICS OF CURRICULUM WHICH FACILITATE LEARNING					
1 Performance objectives and global aspects of curriculum are carefully explained				X	
2 Concepts are presented in humanized or story format				X	
3 Concepts are related to personal interests and experiences of children				X	

CHILD RATING FORM
FIELD-INDEPENDENT OBSERVABLE BEHAVIORS

Instructions: Evaluate the child for each behavior listed below by placing a check in the appropriate column.

An example

Child's Name _____ Grade _____ School _____ Date _____

Observer's Name _____

Global

Situation (e.g., "Math lesson"): for general or overall rating write "Global."

FIELD-INDEPENDENT OBSERVABLE BEHAVIORS	FREQUENCY				
	NOT TRUE	SELDOM TRUE	SOMETIMES TRUE	OFTEN TRUE	ALMOST ALWAYS TRUE
RELATIONSHIP TO PEERS					
1 Prefers to work independently		X			
2 Likes to compete and gain individual recognition	X				
3 Task oriented, is inattentive to social environment when working		X			
PERSONAL RELATIONSHIP TO TEACHER					
1 Rarely seeks physical contact with teacher	X				
2 Formal interactions with teacher are restricted to tasks at hand	X				
INSTRUCTIONAL RELATIONSHIP TO TEACHER					
1 Likes to try new tasks without teacher's help			X		
2 Impatient to begin tasks, likes to finish first		X			
3 Seeks nonsocial rewards	X				
CHARACTERISTICS OF CURRICULUM WHICH FACILITATE LEARNING					
1 Details of concepts are emphasized, parts have meaning of their own		X			
2 Deals well with math and science concepts	X				
3 Based on discovery approach	X				

APPENDIX C
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169-170		Child Rating Form--Field-Sensitive Observable Behaviors and Child Rating Form--Field-Independent Observable Behaviors

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APPENDIX D
CEFT MEANS AND STANDARD DEVIATIONS

		Mean	Std Dev	N
FOR ENTIRE POPULATION		12.6213	5.0327	(272)
GROUP	ANGLO	13.6114	4.9069	(175)
Grade	Third Grade	10.4054	3.9893	(37)
Sex	Male	11.2632	3.9699	(19)
Sex	Female	9.5000	3.9145	(18)
Grade	Fourth Grade	13.3200	4.8799	(50)
Sex	Male	14.4286	5.2400	(21)
Sex	Female	12.5172	4.5247	(29)
Grade	Fifth Grade	13.8163	4.4939	(49)
Sex	Male	14.3793	4.2880	(29)
Sex	Female	13.0000	4.7683	(20)
Grade	Sixth Grade	16.7692	4.3070	(39)
Sex	Male	17.1765	4.9147	(17)
Sex	Female	16.4545	3.8635	(22)
GROUP	BLACK	11.0200	4.7573	(50)
Grade	Third Grade	9.0000	2.9613	(14)
Sex	Male	8.4286	2.9613	(17)
Sex	Female	9.5714	2.8785	(7)
Grade	Fourth Grade	8.0000	3.3806	(15)
Sex	Male	7.0000	2.8284	(9)
Sex	Female	9.5000	3.8341	(6)
Grade	Fifth Grade	14.4444	4.0035	(9)
Sex	Male	13.1667	1.6021	(6)
Sex	Female	17.0000	6.5574	(3)
Grade	Sixth Grade	14.5833	4.8140	(12)
Sex	Male	13.8571	4.6701	(7)
Sex	Female	15.6000	5.3666	(5)
GROUP	MEXICAN	10.6383	4.8473	(47)
Grade	Third Grade	8.1667	4.1084	(12)
Sex	Male	7.8750	2.9001	(8)
Sex	Female	8.7500	6.4485	(4)
Grade	Fourth Grade	10.5833	4.9444	(12)
Sex	Male	11.5000	5.8797	(8)
Sex	Female	8.7500	1.5000	(4)
Grade	Fifth Grade	10.9286	5.3704	(14)
Sex	Male	11.8333	5.2694	(6)
Sex	Female	10.2500	5.7009	(8)
Grade	Sixth Grade	13.5556	3.5395	(9)
Sex	Male	13.5000	.7071	(2)
Sex	Female	13.5714	4.0766	(7)

APPENDIX E

PAT MEANS AND STANDARD DEVIATIONS

		Mean	Std Dev	N
FOR ENTIRE POPULATION		11.4890	3.7984	(272)
GROUP	ANGLO	11.5657	3.6254	(175)
Grade	Third Grade	11.3243	3.7421	(37)
Sex	Male	11.1579	2.6302	(19)
Sex	Female	11.5000	4.7185	(18)
Grade	Fourth Grade	11.6400	3.3912	(50)
Sex	Male	12.0476	3.4275	(21)
Sex	Female	11.3448	3.3941	(29)
Grade	Fifth Grade	12.2653	3.6216	(49)
Sex	Male	12.3103	3.2525	(29)
Sex	Female	12.2000	4.1877	(20)
Grade	Sixth Grade	10.8205	3.7758	(39)
Sex	Male	11.1176	4.7682	(17)
Sex	Female	10.5909	2.8894	(22)
GROUP	BLACK	11.3200	3.8035	(50)
Grade	Third Grade	10.0714	4.0281	(14)
Sex	Male	8.0000	4.4721	(7)
Sex	Female	12.1429	2.2678	(7)
Grade	Fourth Grade	10.5333	3.1593	(15)
Sex	Male	10.3333	3.9370	(9)
Sex	Female	10.8333	1.7224	(6)
Grade	Fifth Grade	12.6667	4.1833	(9)
Sex	Male	14.1667	3.0605	(6)
Sex	Female	9.6667	5.1316	(3)
Grade	Sixth Grade	12.7500	3.6463	(12)
Sex	Male	13.1429	3.1320	(7)
Sex	Female	12.2000	4.6043	(5)
GROUP	MEXICAN	11.3830	4.4505	(47)
Grade	Third Grade	13.9167	4.7186	(12)
Sex	Male	14.5000	5.0143	(8)
Sex	Female	12.7500	4.5000	(4)
Grade	Fourth Grade	9.0833	4.5817	(12)
Sex	Male	9.3750	5.5016	(8)
Sex	Female	8.5000	2.3805	(4)
Grade	Fifth Grade	10.5714	3.3447	(14)
Sex	Male	10.5000	3.6194	(6)
Sex	Female	10.6250	3.3780	(8)
Grade	Sixth Grade	12.3333	4.0620	(9)
Sex	Male	16.5000	2.1213	(2)
Sex	Female	11.1429	3.7161	(7)

APPENDIX F

CRFFIOB/CRFFSOB MEANS AND STANDARD DEVIATIONS

		Mean	Std Dev	N
FOR ENTIRE POPULATION		1.3566	.4799	(272)
GROUP	ANGLO	1.4000	.4913	(175)
Grade	Third Grade	1.3514	.4840	(37)
Sex	Male	1.4211	.5073	(19)
Sex	Female	1.2778	.4609	(18)
Grade	Fourth Grade	1.3600	.4849	(50)
Sex	Male	1.2857	.4629	(21)
Sex	Female	1.4138	.5012	(29)
Grade	Fifth Grade	1.2857	.4564	(49)
Sex	Male	1.2414	.4355	(29)
Sex	Female	1.3500	.4894	(20)
Grade	Sixth Grade	1.6410	.4860	(39)
Sex	Male	1.8235	.3930	(17)
Sex	Female	1.5000	.5118	(22)
GROUP	BLACK	1.3200	.4712	(50)
Grade	Third Grade	1.2857	.4688	(14)
Sex	Male	1.2857	.4880	(7)
Sex	Female	1.2857	.4880	(7)
Grade	Fourth Grade	1.3333	.4880	(15)
Sex	Male	1.3333	.5000	(9)
Sex	Female	1.3333	.5164	(6)
Grade	Fifth Grade	1.3333	.5000	(9)
Sex	Male	1.1667	.4082	(6)
Sex	Female	1.6667	.5774	(3)
Grade	Sixth Grade	1.3333	.4924	(12)
Sex	Male	1.2857	.4880	(7)
Sex	Female	1.4000	.5477	(5)
GROUP	MEXICAN	1.2340	.4280	(47)
Grade	Third Grade	1.3333	.4924	(12)
Sex	Male	1.3750	.5175	(8)
Sex	Female	1.2500	.5000	(4)
Grade	Fourth Grade	1.2500	.4523	(12)
Sex	Male	1.3750	.5175	(8)
Sex	Female	1.0000	.0000	(4)
Grade	Fifth Grade	1.1429	.3631	(14)
Sex	Male	1.1667	.4082	(6)
Sex	Female	1.1250	.3536	(8)
Grade	Sixth Grade	1.2222	.4410	(9)
Sex	Male	1.0000	.0000	(2)
Sex	Female	1.2857	.4880	(7)

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Connie Dee Frazer Curtis was born 18 April, 1946, in Tippecanoe Country, Lafayette, Indiana. She is a citizen of the United States of America.

She received her Bachelor of Arts and Master of Arts in Spanish and French literature from Purdue University in 1968 and 1969, respectively. She taught in public schools of Alabama and Florida for six years. In 1975 she began to work toward a doctoral degree.

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Clemens L. Hallman, Chairman
Associate Professor of Subject
Specialization Teacher Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Allan F. Burns
Associate Professor of Anthropology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Ruthellen Crews
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Leadership and Support

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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This dissertation was submitted to the Graduate Faculty of the Division of Curriculum and Instruction in the College of Education and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Dean for Graduate Studies and Research

August, 1982